



GUIDE TO CHILDREN'S DENTAL CARE IN Medicaid



October 2004

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PREFACE

In the mid-1970's, the Centers for Medicare & Medicaid Services (CMS) (formerly the Health Care Financing Administration), published "*A Guide to Dental Care: EPSDT/Medicaid.*" That Guide was intended to complement, supplement and expand upon policy information contained in CMS' State Medicaid Manual (SMM), which is available on the Internet at www.cms.hhs.gov/pubforms/pub45/pub_45.htm. The Guide was developed for the use of state Medicaid agencies, dental and other health care providers, and national, state and local policy makers involved in organizing and managing oral health care for children under Medicaid's Early and Periodic Screening, Diagnostic and Treatment (EPSDT) service. Now long out-of-print, photocopies of the original Guide continue to be requested frequently by individuals and organizations seeking information on children's oral health services and referred to the Guide by the SMM.

Over the past two decades dramatic changes have occurred in dental science and technology, in public policy approaches to dental care delivery, and in the Medicaid program itself. These changes have been of a magnitude such that much of the information in the original Guide no longer reflects the state-of-the-art of dental service delivery. In addition, CMS, in collaboration with state Medicaid agencies, has been developing initiatives aimed at addressing concerns about children's access to dental services in the Medicaid program. These concerns had been highlighted recently in two reports by the U. S. General Accounting Office and in the U. S. Surgeon General's report on oral health in the Nation. Substantial revision of the original Guide clearly was needed if it was to be of continued value to those seeking modern information about children's dental care in Medicaid.

Consequently, CMS issued a contract to the American Academy of Pediatric Dentistry (AAPD) for the purpose of reviewing the original Guide and developing a revision for use by stakeholders concerned about children's oral health in Medicaid. In fulfillment of its contract, the AAPD developed a draft of the revised Guide, which was disseminated to national organizations for review and comment. This document is based on that revised guide. The information in this Guide is based wherever possible on scientific evidence with appropriate citations provided, and on expert opinion where scientific evidence is inconclusive or not available.

The Guide is intended to serve as a resource of current information on clinical practice, evolving technologies and recommendations in dental care. The guide is not intended to change current Medicaid policies, nor is it intended to impose any new requirements on states.

ACKNOWLEDGMENTS

The draft of the revised Guide was developed by James J. Crall, D.D.S., Sc.D., on behalf of the American Academy of Pediatric Dentistry. Dr. Charles Poland, III, was responsible for the development of Appendix A: Clinical Issues, with the assistance and input of AAPD members including Drs. Paul Casamassimo, Sue Seale, Ross Wezmar and Stephen Wilson. Drs. Paul Casamassimo, David Curtis, Cliff Hartman, Phil Hunke, Jerry Miller, Heber Simmons, Ray Stewart, Ron Venezie and Ross Wezmar also reviewed and commented on various drafts of the document.

DENTAL CARIES IN U.S. CHILDREN

Among the many dental conditions affecting children, dental caries (tooth decay) is the preeminent concern in the context of Medicaid services because of their substantial prevalence in the low-income population. Tooth decay continues to be the single most common chronic disease among U.S. children, despite the fact that it is highly preventable through early and sustained home care and regular professional preventive services.

The prevalence and severity of tooth decay in U.S. children has changed considerably over the past several decades. Once a disease of nearly universal occurrences for nearly all children, tooth decay is now generally distributed in the pediatric population to the point that roughly 80 percent of caries in permanent teeth is concentrated in 25 percent of U. S. children.¹ Also, minority and low-income children disproportionately experience decay in their primary teeth. The high-risk, high-prevalence, high-severity group, which currently represents nearly 20 million children, is largely comprised of low-income children (nearly all of whom are eligible for Medicaid or SCHIP), with higher levels of caries found in African-American and Hispanic groups at all ages.²

Dental caries generally is considered to be reversible or capable of being arrested in the earliest stages through a variety of proven interventions. Beyond the early stages, the decay process generally tends to advance and become more difficult and costly to repair the longer it remains untreated. Hence, treatment initiated early in the course of dental caries development will almost always be easier for both child and dentist, less expensive, and more successful than treatment begun at a later time.

Prevalence and Risk

Data from recent national surveys reaffirm the persistence of dental caries as the single most prevalent chronic disease of childhood. Roughly half of U. S. children experience dental caries by age nine; and the proportion rises to about 80 percent by age 17. Overall, national epidemiological surveys show that nearly one-in-five (18.7%) U.S. children two to four years of age have visually evident tooth decay. Since these surveys are conducted without the aid of dental radiographs (x-rays), typically used as part of dental diagnostic examinations to help detect decay in hard-to-visualize areas (e.g., between adjacent teeth), the actual prevalence is undoubtedly higher. Tooth decay is closely tied to socioeconomic levels, with children from low-income families more likely to

¹ Kaste LM, Selwitz RH, Oldakowski RJ, Brunelle JA, Winn DM, Brown LJ. Coronal caries in the primary and permanent dentition of children and adolescents 1-17 years of age: United States, 1988-1991. *J Dent Res.* 1996 Feb;75 Spec No:631-41.

² Vargas C, Crall J, Schneider D. Sociodemographic distribution of pediatric dental caries: NHANES III, 1988-1994. *J Am Dent Assoc.* 1998;129:1229-1238.

develop caries. Preschoolers in households with incomes less than 100% of the federal poverty level (FPL) are three to five times more likely to have cavities than children from families with incomes equal to or above 300 percent of the FPL. The Third National Health and Nutrition Examination Survey (NHANES III)³ found visible decay in 30 percent of two to five year-old children in poverty and 24 percent of near-poor children (100%-200% of the FPL). Caries was present in only 12 percent of middle-income youngsters and 6 percent were from families with the highest income levels.

Severity

Within the highest-risk, lowest-income group, roughly one-quarter or four to five million children experience more severe levels of the disease, often with associated pain, infection and disruption of normal activities. These children generally acquire the disease early in childhood and often present as infants with multiple teeth in advanced stages of decay (a condition now referred to as “early childhood caries” or “ECC,” and known previously as “baby bottle caries”). Children living in households below 200 percent of the poverty level – roughly half of U. S. children – have three and one half times more decayed teeth than do children in more affluent families.

Unmet Treatment Needs

Dental care is the most common unmet treatment need in children.⁴ Lower-income children have more untreated dental disease than more affluent children who obtain care on a regular periodic basis. Reasons for this disparity include the fact that low-income children are more likely to experience dental disease and frequently only access care on an episodic or urgent basis when decayed teeth cause pain or swelling. NHANES III, the most recent national survey, found that nearly 80 percent of the decayed teeth of poor two to five year olds and 40-50 percent of the decayed permanent and primary teeth in 6-14 year olds were unfilled (untreated).

Consequences

The consequences of severe, untreated dental disease and poor oral health in millions of American children are evident in many dimensions. Biologically, untreated dental disease can lead to pain, infection and destruction of teeth and surrounding tissues with associated dysfunction. Untreated tooth decay may lead to delayed overall development among young children affected with severe forms of the disease. Dental diseases have been shown to be associated with systemic health

³ Vargas C, Crall J, Schneider D. Sociodemographic distribution of pediatric dental caries: NHANES III, 1988-1994. *J Am Dent Assoc.* 1998;129:1229-1238.

⁴ Newachek PW, Hughes DC, Hung YY, Wong S, Stoddard JJ. The unmet health needs of America’s children. *Pediatrics* 2000;105:989-997.

conditions. Socially, affected children have problems with school attendance and performance, and are often stigmatized because of their appearance. Potential consequences to the health system as a result of poor dental health care would include: frequent visits to emergency departments (often without definitive resolution of the presenting problem); hospital admissions; and treatment provided in operating rooms for conditions that are either largely preventable or amenable to less costly care had they been treated earlier.

CONTEMPORARY DENTAL CARE FOR CHILDREN

Emphasis on Early Initiation of Oral Health Care

Science has provided a clear understanding that tooth decay is an infectious, transmissible, destructive disease caused by acid-forming bacteria acquired by toddlers from their mothers shortly after their first teeth erupt (generally around six months of age). In its early stages, the effects of dental caries are largely reversible through existing interventions (e.g., fluorides) that promote replacement of lost minerals from the outer layer of the tooth (enamel). These findings, combined with epidemiological data on the occurrence of tooth decay in infants and young children, suggest that true primary prevention must begin in the first to second year of life. This evidence also suggests that particular attention should be paid to the oral health of expectant and new mothers.

In early childhood there is tremendous growth and development of the face and mouth, with dentition-associated disturbances that may require the attention of dental professionals. Other common oral conditions of childhood (in addition to tooth decay) include: gingivitis and mucosal (soft tissue) infections; accidental and intentional trauma; developmental disturbances associated with teething or tooth formation; poor alignment of teeth or jaws; and craniofacial abnormalities (including clefts of the lip and/or palate). Additionally, parents frequently request information on a diverse array of concerns including: sucking habits; fluoride usage; tooth alignment; timing and order of tooth eruption; and discolored teeth.

Infant Oral Health Care

Infant oral health care begins ideally with prenatal oral health counseling for parents, a service that should be provided by knowledgeable health care providers such as obstetricians, family physicians, pediatricians and nurse practitioners, as well as dental providers. Actual infant oral health care visits focusing on relevant history taking, clinical examination of oral structures, risk assessment, counseling, anticipatory guidance and necessary follow-up interventions should begin early, ideally before dental diseases are established. This early involvement is viewed as the foundation on which a lifetime of positive oral health and dental care experiences can be built, thus minimizing costs associated with treatment of dental diseases.

First Dental Visit

Despite growing recognition of the above, a discrepancy exists between dental and public health organizations' versus the American Academy of Pediatrics' recommended age for a first dental visit. American Academy of Pediatric Dentistry (AAPD) policy, as reflected in its ***“Periodicity of Examination, Preventive Dental Services, and Oral Treatment for Children,”*** (see Appendix A) recommends that children be seen by a dentist following the eruption of the first tooth, but not later than 12 months of age. The AAPD recommendation is embraced by the Bright Futures consortium of 28 child health organizations and is consistent with the policies of the dental and public health groups including the American Dental Association, American Dental Hygienists Association and the American Public Health Association. In contrast, the American Academy of Pediatrics (AAP) recommends that every child should begin to receive oral health risk assessments by 6 months of age from a pediatrician or a qualified pediatric health care professional, and that infants identified as having significant risk of caries or being in a high-risk group should be entered into an aggressive anticipatory guidance and intervention program provided by a dentist between 6 and 12 months of age. **NOTE:** Under the Medicaid program, states are required to develop their own dental periodicity schedules after appropriate consultations with dental groups involved in child health care or states may adopt a nationally recognized dental periodicity schedule.

Successful Models for Achieving Oral Health

“Dental Primary Care”

Professional guidelines (and Medicaid statutory requirements) for addressing pediatric oral health needs are predicated on early and periodic clinical examinations to assess for evidence of pathologic changes or developmental abnormalities, diagnoses to determine treatment needs, and follow-up care for any conditions requiring treatment. These recurring periodic oral assessments (“dental check-ups”) are generally coupled with routine preventive services (self-care instructions, fluoride applications, dental sealants, etc.) and increasingly seek to incorporate assessments of risk factors that elevate the likelihood of destructive changes if allowed to persist. This pattern of periodic assessments, preventive services, and necessary follow-up care also generally applies for adults, who collectively are more susceptible to the development of periodontal disease, oro-pharyngeal cancers, and other soft tissue abnormalities. A large and growing proportion of the U.S. population that has adopted this pattern of care faces relatively few barriers to accessing services because of household income levels and/or private dental insurance. They enjoy unprecedented levels of oral health status. However, access for low-income children remains a challenge.⁵

⁵ Kaste LM, Selwitz RH, Oldakowski RJ, Brunelle JA, Winn DM, Brown LJ. Coronal caries in the primary and permanent dentition of children and adolescents 1-17 years of age: United States, 1988-1991. J Dent Res. 1996 Feb;75 Spec No:631-41.

“Dental Home”

Primary pediatric oral health care is best delivered in a “dental home” where competent oral health care practitioners provide continuous and comprehensive services. Ideally a dental home should be established at a young age (i.e., by 12 months of age in most high-risk populations) while caries and other disease processes can be effectively managed with minimal or no restorative or surgical treatment. An adequate dental home should be expected to provide children and their parents with:

1. An accurate examination and risk assessment for dental diseases,
2. An individualized preventive dental health program based upon the examination and risk assessment,
3. Anticipatory guidance about growth and developmental issues (e.g., teething, thumb or pacifier habits),
4. Advice for injury prevention and a plan for dealing with dental emergencies,
5. Information about proper care of the child’s teeth and supporting structures,
6. Information about proper diet and nutrition practices,
7. Pit and fissure sealants,
8. A continuing care provider that accomplishes restorative and surgical dental care when necessary in a manner consistent with the parents’ and child’s psychological needs,
9. Interceptive orthodontic care for children with developing malocclusions,
10. A place for the child and parent to establish a positive attitude about dental health,
11. Referrals to dental specialists such as endodontists, oral surgeons, orthodontists, pediatric dentists⁶ and periodontists when care cannot be directly provided within the dental home, and
12. Coordination of care with the infant/child’s primary care medical provider.

Recommended Periodicity of Services

Detailed recommendations regarding the periodicity of professional dental services for children can be found in the AAPD’s Reference Manual section on **“Periodicity of Examination, Preventive Dental Services, and Oral Treatment of Children”** and in Appendix A of this Guide. The AAPD’s Reference Manual is available on the Internet at www.aapd.org. The AAPD periodicity schedule outlines the recommended content and periodicity of developmental assessments, clinical examinations, diagnostic tests including radiographic assessments, counseling and prevention activities, and periodic reevaluations. These recommendations generally call for procedures to be repeated at six-month intervals or as indicated by individual patient’s needs or risk for disease.

⁶ Pediatric dentists often function as primary dental care providers for children, but also may serve as referral outlets for difficult-to-treat children initially seen by general dentists.

Recommended policies and practices for general health supervision of children, including oral health, also have been promulgated in a series of *Bright Futures* publications developed with support of the U. S. Department of Health and Human Services. The Bright Futures oral health guide also can be found on the Internet at www.brightfutures.org/oralhealth/index.html.

Behavior Management

It has been estimated that 85 percent of children are generally cooperative in dental treatment settings, while the remaining 15 percent require more advanced behavior management approaches in order to provide dental care. Behavior management has been defined as the purposeful application of accepted techniques – both pharmacological and non-pharmacological – to reduce fear and anxiety, enhance cooperation, and effect treatment. Descriptions of common behavior management techniques used in pediatric dentistry can be found in *Appendix A: Clinical Issues*. A more complete description of techniques, rationale and indications for various approaches can be found in the current Reference Manual of the American Academy of Pediatric Dentistry, available on the Internet at www.aapd.org.

Behavioral management of anxious children, who are unable to readily accept even routine dental treatment, often require additional time on the part of practitioners and support personnel to provide dental procedures. Dentists may be reluctant to treat very young children and those with disabling conditions. This can contribute to limited access to care for both groups of children. Therefore, it is important that dentists receive adequate training in behavior management to be able to provide care for Medicaid children.

POLICY AND PROGRAM CONSIDERATIONS

Early and Periodic Screening, Diagnostic and Treatment Services

Early and periodic screening, diagnostic and treatment (EPSDT) services are required services under the Medicaid program for most individuals under age 21. EPSDT is defined in section 1905(r) of the Social Security Act (the Act) and includes periodic screening, vision, dental, and hearing services and other necessary health services. Schedules specifying the content and periodicity of these services are to be established by each state after consultation with recognized medical organizations involved in child health care (in the case of screening, vision and hearing services) and dental organizations (in the case of dental services).

States must also provide for medically necessary screening, vision, hearing and dental services at other intervals regardless of whether such services coincide with their established periodicity schedules for these services. The Act also requires that any service that states are permitted to cover under Medicaid that is necessary to treat or ameliorate a defect, physical or mental illness or condition identified by a screen must be provided to eligible children, regardless of whether the service or item is otherwise included in the state's Medicaid plan. The determination of medical necessity should be based on accepted standards of dental and oral health practice, and relevant policies developed by recognized dental organizations involved in children's oral health care.

EPSDT services consist of two mutually supportive, operational components:

- assuring the availability and accessibility of required health care resources; and
- helping Medicaid beneficiaries and their parents or guardians to effectively use the resources.

These two components are intended to enable state Medicaid agencies to:

- manage a comprehensive child health program of prevention and treatment,
- seek out eligible children (and their families), and inform them of the benefits of prevention and the health services and assistance available,
- help beneficiaries use health services, and
- provide support services (such as scheduling and transportation assistance).

Fundamental features of this service include the requirement that assessments of children's health needs be provided through initial and periodic examinations and evaluations, and that subsequent measures are taken to assure that health problems are diagnosed and treated early, before they become more complex and costly to treat. More information on EPSDT can be found at www.cms.hhs.gov/pubforms/pub45/pub_45.htm,

Required Dental Services

Section 1905(r)(3) of the Act specifies that dental services: 1) are to be provided at intervals that meet reasonable standards of dental practice, as determined by the state after consultation with recognized dental organizations involved in child health care; 2) are to be provided at such other intervals, indicated as medically necessary, to determine the existence of a suspected illness or condition; and 3) shall at a minimum include relief of pain and infections, restoration of teeth, and maintenance of dental health. Although not specified in the State Medicaid Manual (SMM), it is suggested that consultations with dental organizations, at a minimum, include the state unit of the professional organization representing dentists at large (i.e., state dental association) and pediatric dentists within the state. Each state's dental periodicity schedule should include recommended intervals for routine dental services (e.g., periodic examinations and preventive services). States may also simply adopt a nationally recognized dental periodicity standard without substantial formal

consultation. The periodicity schedule for other EPSDT services (e.g., general health screening services) may not govern the schedule for dental services. It is expected that older children may require dental services more frequently than physical examinations.

Oral screening services are not required for Medicaid children. However, oral screenings may be considered part of comprehensive general health screenings for infants and young children. Children identified through oral screenings as needing additional follow-up services should be referred to qualified dental health personnel for clinical and, if necessary, radiographic examinations and further assessments of associated risk factors.

Direct Dental Referral

Once each child reaches an age specified by the state in its dental periodicity schedule (typically between age one and three years), a direct dental referral is required. Referrals to a dentist may also occur at times other than those described by the periodicity schedule when deemed medically necessary. The dental referral must be for an encounter with a licensed dentist for diagnosis and, if necessary, treatment. Direct referral to a dentist may be met in settings other than a dentist's office. The necessary element is that referred children be evaluated by a dentist. In an area where dentists are scarce or not easily accessible, dental examinations in a clinic or group setting may make the service more appealing to recipients while meeting the state's dental periodicity schedule.

The rationale for direct referral for evaluation by dental personnel beginning at an early age includes:

- the relatively high prevalence of dental caries in Medicaid-eligible infants and preschool-age children;
- limited sensitivity of oral screening procedures conducted by non-dental personnel to detect decay at the level of individual teeth;
- greater potential to arrest or reverse the decay process and minimize damage to teeth and supporting structures when caries is diagnosed and managed beginning in its early stages;
- the difficulty of detecting interproximal decay (decay on the surfaces between adjacent teeth) without the aid of dental radiographs once teeth erupt and are in contact (generally by age 2); and
- dental professional guidelines that call for initiation of dental care beginning by age 1, with periodic re-evaluation and preventive services at intervals based on the child's risk for oral diseases (generally every 6 months, unless risk factors suggest alternative schedules).

Dental assistants, dental hygienists and expanded function dental assistants may perform substantial routine preventive, and certain other radiographic and treatment services when in compliance with state practice acts. At present, dental hygienists are not permitted by any state practice act to make diagnoses. Therefore, the diagnostic component of the EPSDT referral requirement would not be

met.

Health Education

Health education is a required component of screening services and includes anticipatory guidance. At the outset, the physical and/or oral screening provides the initial context for providing health education. Health education and anticipatory guidance to both parents (or guardians) and children is required and is designed to assist in understanding what to expect in terms of the child's development, provide information about the benefits of healthy lifestyles and practices, as well as, accident and disease prevention. Oral health education for children generally includes: counseling about minimizing dietary sugar exposures; recommended daily oral hygiene practices (e.g., brushing with an appropriate amount of fluoride toothpaste); fluoride supplements if indicated; and regular dental care visits for periodic assessments and preventive services. Adolescents should be educated on injury prevention (i.e., wearing protective gear and the harm of using tobacco products and other drugs).

Critical Clinical Elements of Dental Services

This section provides an overview of several critical clinical issues regarding children's dental services, as well as further elaboration of topics introduced in prior sections. A more in-depth discussion of clinical pediatric dental services is found at *Appendix A*.

Dental care includes diagnostic services, preventive services, therapeutic services and emergency services for dental disease which, if left untreated, may become acute dental problems or may cause irreversible damage to the teeth or supporting structures. As noted in Section I, dental diseases and conditions of primary concern during childhood include dental caries (tooth decay) and problems or anomalies related to disturbances of growth and development. Periodontal diseases and other conditions affecting so-called soft tissues within the mouth and underlying bone, often related to systemic health problems, also affect oral health in a smaller percentage of children.

Because children remain at varying levels of risk for dental diseases and developmental disturbances, and because the best outcomes are achieved when these conditions are detected and treated early, periodic examinations at intervals commensurate with levels of risk are recommended for all children starting at an early age and continuing throughout childhood and adolescence. The often insidious onset of dental diseases require that practitioners responsible for children's oral health understand underlying disease processes and have the training, experience, and equipment necessary to accurately diagnose and manage common dental diseases and, when necessary, provide a range of therapeutic services to restore damaged structures.

Preventive Services

Sound preventive strategies have been the key to improvements in oral health for a substantial proportion of American children over the past several decades. The section below lists common preventive dental services for children and a brief summary of the findings of the 2001 National Institutes of Health (NIH) consensus development conference on dental caries or other evidence-based assessments, as noted.^{7,8}

- ***Dietary and oral hygiene counseling*** – The NIH conference indicates that current data provide some support for the efficacy of office-based interventions to modify behaviors, but did not comment specifically on the effectiveness of dietary or oral hygiene counseling. However, a Canadian Task Force on Preventive Health Care noted that although evidence of the effectiveness of dental counseling for inducing positive dietary changes is poor, counseling is recommended for patients at high risk for dental caries. Similarly, although the evidence for effectiveness in preventing tooth decay of daily plaque removal by toothbrushing alone is poor, toothbrushing is essential for self-application of fluoride toothpaste – which is highly recommended for preventing dental caries – and also helps to control gingival (gum) disease.
- ***Dietary fluoride supplements*** – The Canadian Task Force found good evidence of reductions in the incidence of dental caries (tooth decay) if the proper dosage schedule is carefully followed.
- ***Professional topical fluoride applications*** – Acidulated phosphate fluoride (APF) gels have consistent evidence of effectiveness when applied 1-2 times per year in a manner consistent with protocols under which they have been studied. Evidence for the benefit of fluoride varnish application to *permanent teeth* (which begin to erupt around 6 years of age) also is generally positive. The NIH consensus conference concluded that the evidence for effectiveness of fluoride varnish applied to *primary teeth* was incomplete and inconsistent at the time of the conference, generally reflecting a lack of well-controlled studies in younger – e.g., preschool – children. The problem of early childhood caries merits ongoing review of this preventive modality as additional evidence becomes available.
- ***Pit and fissure sealants*** – Dental sealants (plastic coatings that are applied to the grooves and fissures of primary and permanent teeth) have been demonstrated to be effective in

⁷ National Institutes of Health Consensus Development Statement “Diagnosis and Management of Dental Caries Throughout Life,” National Institutes of Health/National Institute of Dental and Craniofacial Research, March 26-28, 2001.

⁸ Lewis DW, Ismail AI, Canadian Task Force on Periodic Health Examination. Periodic health examination, 1995 update: 2. Prevention of dental caries. *Can Med Assn J* 1995;152:836-846.

the primary prevention of caries, and their effectiveness remains strong as long as they are maintained (i.e., through periodic evaluation and reapplication, if necessary).

- ***Topical antimicrobial agents*** – Evidence for the use of chlorhexidine gel is moderately strong (although many studies demonstrating its effectiveness used concomitant preventive measures). Concentrated (professional-strength) fluorides also have antibacterial properties.
- ***Combination interventions for primary caries prevention or for reversing or arresting the progression of carious lesions*** – Evidence concerning combinations of chlorhexidine and fluoride and/or sealants suggests they are effective.
- ***Space maintenance and habit discontinuation appliances*** – Space maintainers are removable or fixed passive appliances designed to prevent tooth movement and generally are placed following the extraction of teeth or in cases of congenitally missing teeth. Habit discontinuation appliances are used to eliminate habits that can adversely affect the development of anatomical structures or functions such as speech (e.g., thumb sucking or oral finger habits). Because they do not directly relate to dental caries, neither review process commented on these devices.
- ***Protective mouth and face guards for children engaged in sports activities*** – Many such devices have been tested and found to be effective in reducing the incidence and severity of sports injuries.

Additional details on preventive dental services can be found in *Appendix A: Clinical Issues* of this Guide.

Diagnostic Services

Accurate and early diagnosis is an essential prerequisite for successful control and treatment of dental diseases and developmental disturbances. The SMM notes that when a general screening examination indicates the need for further evaluation of an individual's health, a referral for diagnostic studies is to be provided without delay. However, the relatively high prevalence of dental diseases and abnormalities in Medicaid-eligible infants and children and the limited sensitivity of current screening procedures provide strong clinical justification for children receiving diagnostic examinations by a dentist beginning at an early age.

Treatment Services

Oral diseases are progressive and cumulative and, if left untreated, become more complex and difficult to manage over time. Medicaid statute and the SMM state that dental therapeutic services must include dental care, at as early an age as necessary, needed for relief of pain and infections, restoration of teeth, and maintenance of dental health. A partial list of dental treatment services specified in the SMM includes:

- Pulp therapy for permanent and primary teeth – e.g., root canal treatments;
- Restoration of carious (decayed) permanent and primary teeth with materials and techniques that meet current accepted practices – e.g., plastic and metal fillings and stainless steel crowns;
- Scaling to control gingival and periodontal diseases;
- Maintenance of space for missing posterior primary and permanent teeth to prevent or minimize problems in eruption of permanent teeth – e.g., fixed and removable space maintainers;
- Provision of removable prosthesis (partial and complete dentures) when masticatory (chewing) function is impaired, when an existing prosthesis is unserviceable or when the condition interferes with employment training or social development; and
- Orthodontic treatment when medically necessary to correct handicapping and other malocclusions.

Additional descriptions of various types of dental treatment services including, in many instances, indications for and objectives of various procedures and expected outcomes can be found in Appendix A: Clinical Issues of this Guide and in the AAPD Reference Manual, available at www.aapd.org. The AAPD's, "***Scope of Dental and Oral Health Care Benefits for Infants, Children, Adolescents, and Young Adults Through Age 21 Year,***" contains an extensive outline of dental and oral health services for children that are in accordance with professionally accepted standards of contemporary dental and oral health practice. The policy statement and accompanying list of procedures can be found in Appendix B of this Guide.

The vast majority of dental treatment services are provided by dentists and allied dental personnel in ambulatory care facilities, generally with the aid of local anesthesia and communicative behavior management approaches. However, many children with extensive dental disease or treatment needs – especially those with early childhood caries, high levels of anxiety about dental treatment, or special health care needs – require additional behavior management approaches which may include various forms of conscious sedation or, in some cases, treatment under general anesthesia.

Emergency Services

Emergency dental services include:

- procedures necessary to control bleeding, relieve pain, or eliminate acute infection – e.g., starting root canal treatment on infected teeth, draining abscesses and infected areas, treating soft tissue swellings associated with erupting teeth, palliative care for oral soft tissue infections such as herpes;
- procedures that are required to prevent “pulpal death” (infection of the nerves and blood vessels inside the tooth) and the imminent loss of teeth – e.g., decay removal, application of medications, temporary fillings; and
- treatment of injuries to the teeth or supporting structures (bone or soft tissues that surround the teeth) – e.g., temporary fillings for fractured teeth, stabilizing loose teeth and supporting bone, cleaning and suturing traumatic wounds; and palliative therapy for pericoronitis (swollen, inflamed tissues associated with impacted or erupting teeth) – e.g., irrigation of swellings, removing debris from infected areas, relieving trauma caused by opposing teeth.

Program Administration

Informing Eligible Children and Families (Outreach Activities)

Families eligible for Medicaid are not often aware of the scope of benefits available to them or their prerogatives and responsibilities, and frequently do not understand the complexities of modern health care systems. In addition, many children and their parents face challenges related to language. Without adequate information and assistance in obtaining oral health services from a largely uncoordinated system of independent dental providers, children often miss out on services necessary to ensure their oral health. The result can be sub-optimal utilization of services characterized by irregular and episodic care-seeking patterns, failure to establish and maintain a regular source of care, failure to complete recommended treatment plans resulting in high levels of unmet treatment needs, failure to gain control of disease processes necessitating more complex and more costly forms of care when treatment is finally sought, and poorer outcomes.

Informing all eligible children and their families about Medicaid services is a critical element for achieving optimal oral health and long-term cost savings for Medicaid-eligible children. All eligible Medicaid recipients under age 21 need to be informed about EPSDT services in a timely manner, generally within 60 days. There are various forms of effective communication states may use. Community-based outreach strategies including health fairs, school programs, Head Start and WIC nutritional programs, faith-based organizations, ethnic/cultural organizations, and public awareness campaigns including common non-English language translations) may be particularly effective in

disseminating information about services that children need, enrollment processes and available benefits. Placing program information in the offices and clinics of various types of health care providers also may help reach and inform eligible families.

Supportive Services (Scheduling and Transportation Assistance)

Medicaid beneficiaries often require additional support services in order to access needed health services. If requested, programs must provide assistance with transportation and scheduling appointments for examinations as well as follow-up diagnostic and treatment services, and arrange for translation services for families that have difficulty communicating in English. Failure to make such arrangements often results in missed appointments that waste clinical care opportunities, discourage provider participation, and delay or interrupt courses of treatment. Such delays and interruptions in treatment generally result in more advanced, difficult and costly subsequent treatment due to the progressive nature of dental diseases, and often lead to poorer health outcomes.

Responsibility for Referrals for Specialty or Advanced-Level Care

The majority of U.S. children receive dental care from general dentists who comprise roughly 80 percent of all practicing dentists and constitute the vast majority of “primary care dentists.” Pediatric dentists, the only primary care dental specialists, comprise about three to four percent of all dentists, but provide both basic and advanced-level care for a disproportionately large percentage of children relative to their numbers. Fortunately, of those children who do experience dental decay, most (roughly 80%) have fairly routine restorative treatment needs and are cooperative for dental treatment. However, the remainder – nearly four to five million American children – have advanced or “catastrophic” levels of disease and frequently present additional challenges due to medical comorbidities, developmental problems or early onset of severe dental disease. These children often require advanced patient management skills on the part of the treating dentist, and frequently require treatment using conscious sedation, deep sedation or general anesthesia. Children with special health care needs, particularly those with developmental disabilities, also often require adaptive environments, modifications to the delivery of routine care, and/or specialized services. Dental care for these children generally is available through pediatric dentists or general dentists with advanced (residency-based) training or skills acquired through intensive professional continuing education. Some aspects of dental care, even for cooperative children, also may necessitate referrals to dental specialists (e.g., for endodontic/root canal, periodontal, surgical, prosthetic or orthodontic services). Failure to establish adequate provider networks or effective linkages among dental providers for these types of care frequently results in high levels of unmet treatment needs, and an ineffective and inefficient system that delivers a preponderance of diagnostic and preventive services at relatively high cost, while failing to meet the comprehensive needs of eligible children. State Medicaid

programs or intermediaries with whom they may contract (i.e., dental plans) should ensure that adequate numbers of advanced-level dental care providers are available to Medicaid beneficiaries.

Dental Advisory Group

Medicaid programs are encouraged to maintain regular communications with dental professionals through formal dental advisory groups comprised of representatives of the pediatric dentistry state unit (society, association), state dental association and other organizations deemed to have an important role in children's dental services. Although not required, establishment of a formal dental Medicaid advisory group can help program officials to stay apprised of contemporary practice techniques and policies. Periodic meetings with dental professionals who actively participate in the Medicaid program also help Medicaid program administrators identify administrative issues of concern to dentists. Recent experience in several states has shown that ongoing communications with dental advisory groups has been critical to building improved relationships between Medicaid programs and practicing dentists, and to increasing dentist participation in Medicaid. Dental advisory groups can offer guidance to the state regarding issues such as appropriateness of certain services in specific situations, help in resolution of conflicts among providers, patients and the state Medicaid agency, and provide other practical assistance.

Elements of Systems Capacity and Integration

State Medicaid agencies increasingly are becoming involved in managing and organizing, rather than merely paying for, the services for which they are responsible for providing to program beneficiaries. As a result, many state Medicaid agencies are exploring approaches to broaden and integrate the contributions of dental and other health care providers to improve oral health status and enhance the delivery of dental care to Medicaid enrollees in their states. Medicaid agencies have substantial opportunity to influence the development of at least the following integrated system components:

- ***Universal, periodic assessments*** to determine risk, disease status, or need for treatment;
- ***Professionally grounded guidelines or protocols*** for reducing disease burden and appropriate use of treatment services based on levels of risk, disease status, or indications for treatment;
- ***Effective health promotion, primary prevention, and disease management programs;***
- ***Effective referral mechanisms*** linking “non-dentist” assessors who do not provide additional services to prevention and disease management programs for those at risk, but without disease, and to dentists for those in need of disease management and/or reparative services;
- ***Effective dental referral mechanisms*** among general dentists and pediatric dentists or other specialists for children with advanced levels of disease or special management

considerations;

- ***Case management and care coordination*** to facilitate completion of follow-up activities and episodes of care;
- ***Programs to develop service capacity in dental provider shortage areas***, including both workforce and facilities;
- ***Organized systems of care*** with defined and enforced performance standards for entities that are delegated responsibilities for specified populations or geographic areas; and
- ***Effective management information systems*** to monitor performance and support quality improvement.

Performance Monitoring / Accountability

Performance Measurement

Health care practices and arrangements increasingly are being driven by an emphasis on performance with respect to cost and quality, growing demands for accountability, and consumer and purchaser choice in a market-driven health care system. In each of these areas, performance measurement – *the quantitative assessment of health care processes and outcomes for which an individual practitioner, provider organization, health plan or public benefit program (e.g., Medicaid) may be accountable* – plays a critical role.

Performance measurement should be a high priority for public benefit programs regardless of whether individual states choose to delegate a portion of their program administrative responsibility to managed care organizations (MCOs) or fully administer their own programs. Unfortunately, performance measurement has not been widely developed or applied in the area of pediatric oral health. Instead, program administrators have often focused on superficial comparisons of profiles of services provided to Medicaid children with those reflecting services provided to commercially insured populations. As these populations have substantially different treatment needs, such comparisons may result in inappropriate benchmarks, erroneous conclusions (e.g., that matching commercially insured population service profiles indicates delivery of services that are appropriate for Medicaid populations) and undue utilization review activities that discourage dentists' participation in Medicaid.

Program Goals

The goals of performance measurement and assuring program accountability are linked to the

overall Medicaid goals of:

- assuring the availability and accessibility of required health care resources; and
- helping Medicaid recipients and their parents or guardians effectively use the resources.

The CMS Form 416 dental reporting requirements, as revised effective January 1999, were designed to reflect a maturation of program goals, enabling states to transition from emphasizing annual dental visits towards assessments of the types of services provided (e.g., the percentage of Medicaid-eligible beneficiaries receiving preventive and treatment services). Additional development and implementation of systems that track and link process measures (e.g., the percentage of children who are screened and subsequently referred for treatment) and outcomes (e.g., the percentage of children who complete recommended treatment plans or become caries-free, and assessments of consumer satisfaction) is a shared concern that needs to be promoted by both Medicaid programs and the dental profession.

CMS/NCQA Pediatric Oral Health Performance Measures Project

In view of its role as the primary public agency responsible for pediatric oral health services for children, CMS asked the National Committee on Quality Assurance (NCQA) in October 1998 to establish an Expert Panel to identify and evaluate current pediatric oral health performance measures, especially as they relate to managed care dental programs in Medicaid. The Panel's final report remains relevant today and provides findings and conclusions concerning the:

- current state of pediatric oral health in the United States and the way dental care is delivered;
- current state of performance measurement in pediatric oral health;
- Panel's recommendations for immediate and future measure development; and
- current limitations facing measure development efforts in this area.

The report and recommendations (summarized below) were published in summary form in an issue of the *Journal of Public Health Dentistry*⁹ and represent a resource for agencies, organizations and individuals interested in monitoring the performance of pediatric oral health care provided through public programs and commercial third-party arrangements.

Review of Current Measures

In the expert panel's view, the single HEDIS (Health Plan Employer Data and Information Set) access measure currently applicable to Medicaid pediatric managed care dental programs – *Annual Dental Visit* – should be strengthened by adding age stratification, and should ultimately

⁹ Crall JJ, Szlyk CI, Schneider DA, et al. Pediatric oral health performance measurement: current capabilities and future directions. *J Public Health Dent* 1999;59:136-141.

be replaced with a new measure – *Use of Dental Services by Children*. This proposed new measure profiles the use of different types of services – percentage of children receiving any service, any preventive service, and any “treatment” service (i.e., any service beyond diagnostic and preventive services) – and is similar to the revised Form 416 dental measure implemented for states reporting on their children's dental services, beginning in January 1999. NCQA currently is considering the panel’s recommendation for inclusion in HEDIS.

Possible Considerations for Future Measures

Measures of access and utilization provide only a limited basis for assessment of the degree to which health plans or programs address other important domains of performance measurement. The NCQA Panel’s recommendations for future measures provide direction for the development of additional measures that begin to address the domains of effectiveness of care, satisfaction with the experience of care, involvement in decision making, and the cost and value of care. Although the Panel categorized these as future measures, a considerable amount of preliminary development is already underway.

Effectiveness of care may include:

- Assessment of Disease Status – Percentage of all child enrollees who have had their periodontal and caries status assessed within the past year.
- New Caries Among Caries-active Children – Proportion of all caries-active child enrollees who receive treatment for caries-related reasons within the reporting year.
- New Caries Among Caries-inactive Children – Proportion of all previously caries-inactive child enrollees who receive treatment for caries-related reasons within the reporting year.
- Preventive Treatment for Caries-active Children – Percentage of all caries-active child enrollees who receive a dental sealant or a fluoride treatment within the reporting year.

Further development of these measures is tied to use of diagnostic codes in dentistry. Recently, the American Dental Association has issued diagnostic codes, and a limited number are currently available in a set of newly released codes (Current Dental Terminology 2000, CDT-4).

Satisfaction with Services

Recommended measures include a pediatric oral health survey module that inquires about:

- Access to care,
- Availability of a regular source of care,
- Timeliness of care,
- Adequacy of information and extent of involvement in decision-making,
- Overall satisfaction with care, and
- The extent to which treatment needs have been met.

Initial development work on a pediatric dental module that parallels the Consumer Assessment of Health Plans Survey (CAHPS) that has been developed with support from the Agency for Healthcare Research and Quality has been conducted. Field-testing of an initial set of measures is planned for the fall of 2001.

Value of Services – This measure is designed to provide information on the monetary value of services being delivered to Medicaid and SCHIP beneficiaries in order to facilitate assessments of how plans manage the resources allocated for providing oral health care for their enrollees. Data for the Value of Services measure are readily available from administrative data files for the majority of existing plans and programs.

SUMMARY

The development of this Guide was undertaken with the following premises in mind:

- that the Centers for Medicare & Medicaid Services, state Medicaid programs, and professional communities have a joint interest in developing and sustaining effective and efficient programs to meet the oral health needs of children covered by Medicaid; and
- that collaborative efforts among these stakeholders, both at the national and state levels, will help to produce and improve programs that meet those needs.

We have attempted here to provide material concerning both key clinical aspects of oral health care for children and critical program administration issues. Additional information is available in the Appendixes and from various professional and governmental organizations cited in the text.

Appendix A: Clinical Issues

A. Guidelines for Pediatric Dental Care¹

1. Preventive Services

a) Use of Fluorides

Use of fluorides for the prevention and control of dental caries is documented to be both safe and highly effective. Optimizing fluoride levels in water supplies in many ways is an ideal public health measure because it is effective, relatively inexpensive, and does not require conscious daily cooperation from individuals. Daily fluoride exposure through water supplies or supplemental tablets, and monitored use of fluoride dentifrice (“pea-size” amount on brush) should be recommended for all children as a primary preventive procedure. Professional fluoride treatments should be based on caries risk. Home protocols should be advised for children considered at higher caries risk.

Systemically Administered Fluoride Supplements – Fluoride supplements should be considered for all children drinking fluoride deficient water (≤ 0.6 ppm F). Before supplements are prescribed, it is essential to know the fluoride concentration of the patient’s drinking water. Review and, if necessary, testing of all sources of drinking water (i.e., home, day care, and school) are essential to determining the patient’s need for fluoride supplements. Once the fluoride level of the water supply has been evaluated, either through contacting public health officials or independent water analysis (especially important for families relying on well water or homes with in-house filtration systems), and other sources of dietary fluoride have been assessed, the daily dosage schedule can be recommended and reviewed with parents in the context of appropriate fluoride usage.

Dietary Fluoride Supplementation Schedule

Age	Less than 0.3 ppm F	0.3-0.6 ppm F	More than 0.6 ppm F
Birth–6 mos.	0	0	0
6 mos.–3 yrs.	0.25 mg	0	0
3 yrs.–6 yrs.	0.50 mg	0.25 mg	0
6 yrs. to 16 yrs.	1.00 mg	0.50 mg	0

Professionally Applied Topical Fluoride Treatment – Eight percent stannous fluoride solution, 1.23% acidulated phosphate fluoride (APF) solution or gel and 5% sodium fluoride varnish are clinically proven agents for professionally applied fluoride treatments. Selection of an agent for a specific treatment generally depends on provider preference, setting and available equipment, and factors related to the child (e.g., age, level of development). APF is widely used because of better stability, patient acceptance and ease of application. Fluoride varnish has physical properties that may minimize ingestion by young

¹ Selected references are provided for various sections. Additional references and information related to various sections can be found in the AAPD Reference Manual, available on the Internet at www.aapd.org or from the American Academy of Pediatric Dentistry, Chicago, IL.

children and children with disabilities. Appropriate precautionary measures should be taken to prevent or minimize swallowing of professionally applied topical fluorides.

Self- or Parentally Applied Fluoride – The use of fluoride containing toothpaste should be recommended as a primary preventive procedure. However, the use of fluoridated toothpaste in children who cannot expectorate consistently carries an increased risk of dental fluorosis (alteration of tooth appearance or structure due to high levels of fluoride in the outer enamel layer of a tooth). Therefore, the risk of fluorosis must be weighed against the benefit of caries prevention in determining the use of a fluoride-containing toothpaste by a child. Parents/caregivers should be counseled on the frequency of tooth brushing and use of no more than a “pea-sized” amount of toothpaste.

Children at high risk for caries (e.g., children with orthodontic/prosthetic appliances, with special health care needs, with reduced salivary function, who are unable to clean teeth properly, who are at dietary risk, or who have high oral levels of *Streptococcus mutans*. (*S. mutans*) or who are caries active should be considered for additional fluoride treatment. Daily home fluoride programs using fluoride mouth rinses or brush-on fluoride gels should be considered. If a high caries risk patient cannot or will not comply with home fluoride therapy, frequent professional fluoride treatments may be necessary.

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4. Bawden JW: Fluoride varnish: a useful new tool for public health dentistry. *J Public Health Dent* 58: 266-269, 1998.

b) Pit and Fissure Sealants

Sealants are plastic-like materials that are bonded to caries-susceptible pits and fissures on tooth surfaces that remain decay-prone even when exposed to fluoride and are used to protect these areas from caries development or progression. Ideally, sealants should be placed as soon as technically possible after teeth erupt for maximum decay prevention; however, newly or partially erupted teeth are often hard to keep dry enough to promote good bonding of the sealant to the tooth. Sealants may be applied in conjunction with small composite resin restorations in localized areas of decay to provide protection against caries while preserving tooth structure (sometimes referred to as preventive resin restorations).

Indications/Diagnoses: Sealants are indicated as a preventive measure for high-risk primary molars, permanent molars and premolars with deep pits and/or fissures, and in the cingulum area of maxillary incisors with deep lingual pits and/or fissures. Sealants also are generally recommended as a preventive measure for permanent molars. Sealants can be applied to teeth with evidence of decay to arrest the progress of decay; however, all sealed teeth and especially those with evidence of early signs of decay need to be monitored regularly to ensure that the sealants are retained and performing effectively to arrest decay. Sealants also are often applied in conjunction with the placement of resin restorations in cases of one or more small areas of decay on fissured surfaces to provide protection against caries while preserving tooth structure.

Outcomes: The sealed surfaces should remain caries-free or free of caries progression. Sealants should be monitored, and those that have chipped or been lost should be repaired or reapplied.

2. Restorative Services

Restorative treatment consists of procedures that replace diseased or damaged portions of teeth with materials that recreate form and function, and where needed, esthetic appearance. Restorative decisions are based on an overall treatment plan that considers tooth status, restorative material attributes and limitations, individual caries risk assessment, anticipated compliance with disease management recommendations, likelihood of timely follow-up care and the patient's ability to cooperate during treatment. Restorative dental care is considered “medically necessary” for the purpose of preventing, controlling and eliminating dental and orofacial infection, pain, disease and restoring form and function.

Historically, treatment of dental caries in primary and permanent teeth has involved clinical or radiographic identification of carious lesions followed by “surgical” interventions that remove affected tooth structure and restore form and function with an appropriate dental restorative material. For front (anterior) teeth, restoration of appearance may also be an important consideration. Modern dental therapies now address decay both by removing diseased enamel (outer layer of the tooth) and dentin (a mineralized layer that lies between the enamel and the inner pulp or nerve chamber) and placing restorative materials, and by fostering remineralization of weakened enamel to reduce further breakdown. Selection of appropriate therapies in a child requires an understanding of the caries process that includes patient’s age, caries risk factors, prior therapy outcomes, and location and extent of decay. A child who has been identified as being at low risk for dental caries may need fewer diagnostic, preventive and restorative procedures. Conversely, a child who is caries-active or at high risk for caries development may require more frequent diagnostic and preventive procedures, or more extensive restorative dental services (e.g., larger restorations or stainless steel crowns instead of metal or plastic fillings). If properly implemented, These approaches to pediatric oral health care will result in optimal oral health for children and value for public expenditures.

Primary Tooth Considerations – Important differences between primary and permanent teeth may affect diagnosis, caries risk and restorative therapy. Most importantly, there are differences in dental caries susceptibility and progression between primary and permanent teeth. Anatomical differences such as narrow, short clinical crowns affect the support and retention of restorations. The pits and fissures of primary teeth are less pronounced than those of permanent teeth, potentially making these surfaces less susceptible to caries. However, primary teeth have thinner enamel and dentin that places them at higher risk for rapid caries progression. They also have broader proximal contacts than permanent teeth requiring considerable removal of tooth structure for multi-surface restorations, and relatively larger pulp chambers that increase the likelihood that root canal therapy will be needed for advanced decay. While therapies and treatment outcomes for primary teeth need not last as long as those for permanent teeth, it should be recognized that primary teeth are critical to a child for eating, appearance and maintaining space for permanent teeth. Additionally, lack of preventive and restorative therapy in primary teeth will place permanent teeth at greater caries risk with possible detrimental effects on general health and quality of life.

A unique feature regarding caries management of primary teeth is that a child’s age is an important factor with regard to caries initiation and progression. The age at which a child’s teeth becomes colonized with cariogenic (cavity-causing) bacteria, primarily *S. Mutans*, is a critical factor for caries risk. These bacteria are believed to be particularly caries-conducive because of their ability to adhere to tooth surfaces, to produce copious amounts of acid, and to survive and continue metabolism at low pH (acidic) conditions. Treatment for Early Childhood Caries (previously know as "baby bottle tooth decay") becomes extremely challenging because of the virulent nature of the disease, the high potential for new

and recurrent caries, and the risk and expense of putting a child through multiple treatment appointments over a period of several years. In young children who are at significant risk for caries because of low potential for maintaining oral hygiene and decreased likelihood of timely recall (follow-up care), restorative treatment may involve increased use of stainless steel crowns in order to increase the longevity of the restoration and remaining tooth structure.

Common Types of Restorations

a) Composite Resin/Glass Ionomer Restorations – Anterior Primary and Permanent Teeth

These restorations make use of tooth-colored filling materials that are capable of bonding to tooth structure, thereby helping to reduce the need for extensive removal of non-carious tooth structure to establish adequate retention of the restoration.

Indications/Diagnoses: Composite resin restorations are used for the conservative, esthetic restoration of caries in primary and permanent anterior teeth when careful control of moisture can be obtained. Glass ionomer restorations are often used as part of Atraumatic Restorative Treatment (ART) of primary anterior teeth in very young children with early childhood caries as an interim caries control measure.

Outcomes: The restoration of tooth form, function and, where necessary, acceptable appearance. In cases of ART, the primary anterior teeth are preserved until the child is older, can tolerate more elaborate and lengthy treatment procedures, and can have more durable restorations placed.

b) Composite Restorations – Posterior Teeth

These are technique-sensitive, tooth-colored restorations that involve bonding to tooth structure, thereby reducing the need for extensive removal of non-carious tooth structure to establish appropriate retention.

Indications/Diagnoses: Composite restorations are used for the restoration of carious lesions and/or developmental defects in posterior primary and permanent teeth where adequate moisture control can be achieved. Stainless steel crowns may be a more suitable (durable) restoration for primary teeth with decay or defects involving three or more surfaces or when extensive tooth structure has been removed.

Outcomes: The restoration of tooth form, function and, where necessary, acceptable appearance. Efforts should be made to monitor restorations at recall appointments for recurrent caries, breakage and wear.

c) Amalgam Restorations – Primary and Permanent Teeth

Amalgam is a crystallized metal alloy condensed into a cavity preparation to restore the tooth to appropriate form and function.

Indications/Diagnoses: Amalgam is used for the restoration of carious lesions and/or developmental defects in posterior primary and permanent teeth. Stainless steel crowns may be a more suitable (durable) restoration for primary teeth with decay or defects involving three or more surfaces or when extensive tooth structure has been removed. Because this material commonly is not considered to be esthetic, amalgam generally is contraindicated for anterior teeth on plainly visible surfaces.

Outcome: The restoration of form and function. Efforts should be made to monitor restorations at recall appointments for recurrent caries, breakage and wear.

d) Stainless Steel Crown Restoration - Primary and Permanent Teeth

Stainless steel crowns are prefabricated metal crown forms that are adapted to individual teeth and cemented with a biocompatible luting agent. They are the most durable restoration available for primary teeth.

Indications/Diagnoses: These crowns are used for the restoration of primary anterior and posterior teeth with caries on more than one surface, extensive caries, cervical (near the gum line) demineralization, decalcification, and/or developmental defects (such as hypoplasia and hypocalcification), when failure of other available restorative materials is likely (e.g., wide interproximal cavities), for patients who grind their teeth excessively (bruxism), following removal of pulp tissue (pulpotomy or pulpectomy), for restoring a primary tooth that is to be used as an abutment (attachment) for a space maintainer, for the intermediate restoration of fractured teeth, for any decay located where a filling material will not have sufficient strength to last the life of the tooth, and where recall appointments to monitor recurrent caries, breakage and wear are uncertain. When used for permanent teeth, these restorations are usually acceptable only for temporary service until a more durable, periodontally-compatible, full cast crown is constructed.

Outcomes: The restoration of tooth form and function.

e) Open-Face Stainless Steel Crown/Veneered Stainless Steel Crown Restoration - Primary Anterior Teeth

Open face stainless steel crowns are prefabricated metal crown forms that are adapted to individual teeth and cemented with a biocompatible luting agent. The labial (visible) surface of the crown is removed and replaced with a composite or glass ionomer tooth-colored material. Veneered stainless steel crowns have a tooth-colored material bonded to the labial (visible) surface of the crown. These restorations are more esthetic than traditional stainless steel crowns and are a durable restoration for primary anterior teeth.

Indications/Diagnoses: These crowns are used for the restoration of primary anterior teeth with interproximal caries, caries on more than one surface, rampant caries, cervical decalcification, congenitally malformed teeth, and/or developmental defects, (such as hypoplasia and hypocalcification) when failure of other available restorative materials is likely (e.g., wide interproximal cavities), following pulpotomy or pulpectomy, for the restoration of fractured teeth or where recall appointments to monitor recurrent caries, breakage, and wear are uncertain.

Outcomes: The restoration of tooth form, function and acceptable appearance.

f) Resin Crowns – Primary and Permanent Anterior Teeth

Anterior resin crowns are tooth-colored, tooth shaped restorations that are bonded to front teeth.

Indications/Diagnoses: These crowns are used for the same purpose as open faced stainless steel crowns and may be more esthetic, but generally are not as durable.

g) Full Cast or Porcelain-Fused-to-Metal Crown Restoration– Permanent Teeth

A fixed (cemented) restoration that employs precious, semi-precious or non-precious metal that is formed to a desired anatomic shape or that employs a metal substructure to which a ceramic veneer is fused.

Indications/Diagnoses: These restorations are indicated for permanent teeth with developmental defects, extensive decay or traumatic loss of structure. They also are used to restore teeth following endodontic (root canal) therapy, as abutments for fixed prostheses and for restoration of single-tooth dental implants. The porcelain-fused-to-metal variety which covers the metal with tooth-colored porcelain is generally

used when the tooth surface being repaired is exposed to public view (e.g., on anterior teeth) and visible metallic color would be esthetically unacceptable.

Outcomes: Form, function and, where applicable, acceptable appearance should be restored. The vitality of the tooth should be maintained unless the pulpal (nerve) tissues are compromised by disease or trauma.

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3. Prosthetic Services

a) Fixed Prosthesis for Missing Teeth – Permanent Teeth

These prostheses ("bridges") replace one or more missing primary and/or permanent teeth. The prosthesis is attached/cemented/bonded to one or more natural teeth or implants (known as the bridge "abutments") and cannot be removed by the patient. The portion that replaces a missing tooth is called a "pontic."

Indications/Diagnoses: These restorations restore tooth form, function and, where necessary, acceptable appearance for missing teeth, maintain the integrity of the dental arch (upper or lower set of teeth), and prevent drifting and malalignment of adjacent or opposing teeth. These prostheses also are often indicated in children with craniofacial abnormalities.

Outcomes: Form, function and, where applicable, acceptable appearance should be restored.

b) Removable Prosthetic Appliances – Permanent Teeth (and Primary Teeth in Special Circumstances)

Appliances used for the replacement of one or more teeth in a dental arch to improve chewing efficiency, prevent or correct harmful habits or speech abnormalities, maintain arch space in the developing dentition, or obturate (replace structure in) congenital or acquired orofacial defects (e.g., cleft palate). These appliances are also known as complete or partial dentures. These appliances can be removed by the patient and, therefore, are not as stable as fixed prostheses.

Indications/Diagnoses: These appliances may be indicated in special circumstances (e.g., multiple missing teeth in the same dental arch when a fixed prosthesis cannot be placed because of the child's

developmental status) in a primary, mixed, or young permanent dentition with missing teeth to serve as functional space maintainers, obturate congenital or acquired defects, establish acceptable appearance or occlusal function, and facilitate speech development or feeding in infants. Children with special health care needs, such as children with ectodermal dysplasia or cleft palate, often may need dentures to correct severe tooth development problems. (See also discussion of space maintainers below)

Outcomes: Form, function and, where indicated, acceptable appearance should be restored or improved.

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4. Pulp Therapy for Primary and Permanent Teeth

The “dental pulp” is comprised of nerves, blood vessels and connective tissue located within a confined space in the interior of a tooth, generally referred to as the root canal (portion within the root) and pulp chamber (portion within the part of the tooth that is visible in the mouth). Maintaining pulp vitality in a tooth affected or infected by caries, traumatic injury, or other insults is desirable, but not always possible. However, if properly treated, a tooth can remain functional and stable without a vital pulp.

Successful pulp therapy depends on the acquisition and analysis of appropriate diagnostic data to assess the status of a pulp that has been affected or infected by decay, exposed during caries removal or tooth preparation, or subject to traumatic injury. Diagnosis to determine appropriate pulp therapy in children should include an appropriate medical and dental history, visual and radiographic evaluation, and additional tests such as palpation, percussion and assessment of mobility and pulp vitality. Treatment planning should include consideration of the value of each involved tooth in relation to the child’s overall development and consideration of alternatives to pulp therapy. In cases where an infectious process cannot be managed by the treatment methods included in this section, adequate bony support cannot be regained, or inadequate tooth structure remains for an appropriate restoration, extraction of the involved tooth or teeth may have to be considered. Follow-up assessment of pulp therapy requires periodic clinical evaluations of the treated tooth and surrounding structures, and may require periodic radiographic assessments as well.

Common Pediatric Pulp Therapy (Endodontic) Procedures

a) Protective Base

Placement of a protective base material is considered part of the restorative procedure and is not reportable as a separate service. A protective base is a material placed over the pulpal surface of a cavity preparation to cover exposed dentin tubules and act as a protective barrier between the restorative material or cement and the pulp of the tooth. A radiopaque material (i.e., one that is visible on x-rays) that possesses suitable physical properties and biocompatibility should be used.

Indications: When dentin is exposed during the preparation of a tooth for a restoration, a protective radiopaque base may be placed between the restorative material and the dentin overlying the pulp to minimize injury to the pulp or promote pulp tissue healing.

Objectives: A protective base is utilized in efforts to preserve the vitality of the tooth and promote pulp tissue healing and reparative dentin formation. Adverse post-treatment clinical signs or symptoms such as sensitivity, pain or swelling indicate possible continued pulpal infection and warrant additional monitoring, tests and, if necessary, treatment.

b) Indirect Pulp Treatment (Capping)

A procedure in which some residual carious dentin is not removed from a tooth with a deep carious lesion in order to avoid pulp tissue exposure. A radiopaque base is placed over the remaining dentin to promote pulp vitality and/or reparative dentin formation.

Indications/Diagnoses: Indirect pulp capping is indicated in a tooth that has a deep carious lesion near the dental pulp and when clinical and radiographic examinations indicate a vital pulp capable of healing.

Outcomes: The restorative material should completely seal involved dentin from the oral environment. Radiographic and clinical evidence on post-treatment assessments should indicate continued tooth vitality. Adverse post-treatment clinical signs or symptoms such as sensitivity, pain or swelling indicate possible continued pulpal infection and warrant additional monitoring, tests and, if necessary, treatment.

c) Direct Pulp Treatment (Capping)

The placement of an appropriate biocompatible radiopaque base when a small exposure of the pulp is produced during decay removal, cavity preparation or following traumatic injury.

Indications/Diagnoses: Direct pulp capping is used for *small* mechanical or traumatic pulp exposures in primary or permanent teeth when clinical and radiographic examinations indicate a vital pulp capable of healing.

Outcomes: The restorative material should completely seal involved dentin from the oral environment. Radiographic and clinical evidence on post-treatment assessments should indicate continued tooth vitality. Adverse post-treatment clinical signs or symptoms such as sensitivity, pain or swelling indicate possible continued pulpal infection and warrant additional monitoring, tests and, if necessary, treatment.

d) Vital Pulpotomy

Pulpotomy involves amputation of pulp tissue from the pulp chamber (portion of the pulp located within the visible portion of a tooth) and treatment of the remaining vital pulp tissue surface with a suitable material.

Indications/Diagnoses: Pulpotomy is used in primary teeth when the infected tissue can be amputated and the remaining tissue is judged to be vital by clinical and radiographic criteria. Pulpotomy can be used as an interim measure in permanent teeth when time constraints or economic circumstances prevent immediate conventional root canal therapy.

Objective: The tooth should remain in the dental arch without adverse post-treatment signs or symptoms such as sensitivity, pain mobility or swelling. Radiographic assessments should indicate continued vitality of pulp tissue within the root canal and integrity of the bony areas surrounding the root(s).

e) Pulpectomy

Pulpectomy involves removal of the entire pulp from within primary or permanent teeth followed by cleaning, enlargement and disinfection of the root canals. In primary teeth, the canals are filled with a resorbable material and the tooth is restored with a durable restoration (usually a stainless steel crown, especially for posterior teeth). In permanent teeth, pulpectomy generally is followed by conventional root canal treatment and restoration with a cast crown.

Indications/Diagnoses: A pulpectomy is indicated in primary teeth with carious pulp exposures in which, following coronal pulp amputation, the pulp exhibits clinical signs of hyperemia or chronic inflammation

(e.g., excessive bleeding) or in cases where there is evidence of pulp necrosis (non-vital pulp) with or without caries involvement.

Outcomes: The inflammatory process should resolve as evidenced by clinical and radiographic signs and absence of adverse symptoms. The treatment should permit physiologic resorption of primary root structures and filling materials at the appropriate time to allow normal eruption of succeeding permanent teeth.

f) Conventional Root Canal Therapy

In permanent teeth, conventional root canal treatment involves removal of the pulp tissue followed by cleaning, disinfecting, shaping and obturation (filling) of the root canal with a biologically acceptable non-resorbable filling material. Teeth that have had conventional root canal therapy require subsequent restoration to replace tooth structure removed to provide access for root canal instrumentation as well as any structure affected by decay or trauma. Increased potential for tooth fracture following conventional root canal therapy may warrant placement of a cast crown.

Indications/Diagnoses: Root-canal therapy is indicated for permanent teeth with exposed, infected or necrotic pulpal tissue whenever the prognosis for tooth restoration, retention and function is judged to be favorable.

Outcomes: Adequate filling and sealing of the root canal with an appropriate biocompatible material extending to within acceptable proximity to the apex (end) of the root canal. The tooth should remain in the dental arch without adverse post-treatment signs or symptoms such as sensitivity, pain, mobility or swelling. Radiographic assessments should indicate resolution of inflammation and integrity of the bony areas surrounding the root(s). Conventional root canal therapy generally has a very high success rate (over 90%).

g) Root Formation (Apexogenesis):

This less common procedure promotes normal root and apex formation (apexogenesis) in pulpally involved, vital permanent teeth with immature root development. It involves the amputation of the affected pulp tissue. The remaining pulp tissue is treated with a suitable biocompatible agent that encourages normal root formation and apical closure.

Indications/Diagnoses: This procedure is indicated for traumatized or pulpally involved, vital permanent teeth when the root apex is not completely formed. It generally is considered to be an interim procedure to promote root apex development so that conventional root canal therapy can be accomplished later.

Outcomes: The remaining pulp should remain vital. Root development and apex closure should continue, and allow for subsequent conventional root canal therapy.

h) Apexification

Apexification is another less common procedure for inducing apical closure of the root or roots of an incompletely formed, *non-vital* permanent tooth by removing the pulp tissue just short of the root end and placing a suitable biocompatible agent in the canal. Several applications of the agent may be necessary. Once apical closure is obtained, root-canal therapy should be completed and the tooth restored.

Indications/Diagnoses: This procedure is indicated for non-vital permanent teeth with incompletely formed roots for the purpose of promoting continued root development to facilitate conventional root canal treatment.

Outcomes: This procedure should induce root end closure (apexification) at the apices of immature roots, as evidenced by periodic radiographic evaluation.

Surgical Root Canal Therapy

Surgical root canal therapy procedures are used infrequently in children, but may be necessary as indicated below.

a) Apicoectomy

Apicoectomy is a surgical procedure in which a portion of the apex (end) of one or more roots is removed to evaluate or improve the apical seal of the root-canal filling; facilitate access for creation of a root end preparation for a retrofilling; allow for curettage (cleaning) of infected or anomalous areas beyond the root; or remove a portion of the root which cannot be obturated with a root-canal filling material because of severe curvature of the root or blockage of the root-canal space.

Indications: Apicoectomy is indicated when a persistent problem beyond the end of the root has not decreased in size or shows evidence of enlarging after completion of conventional root-canal treatment. It may be utilized when a sinus tract or inflammation persists, when a biopsy or surgical exploration of the area is deemed necessary, and/or when there is evidence of marked apical over-extension of filling materials into the area beyond the root. This procedure also may be indicated when apical curettage reveals an inadequate seal of a previously filled root, when an unfilled apical portion of the root-canal system is not accessible from a conventional approach from within the tooth, or when an obstruction such as a post or broken root canal instrument prevents non-surgical treatment.

Objective: Absence of post-treatment adverse clinical signs or symptoms such as sensitivity, pain, or swelling. There should be evidence of normal reestablishment of the periodontal ligament space and alveolar bone at the apex of the surgically altered root(s) and resolution of any sinus tract(s). There should be no damage to adjacent teeth or anatomical structures.

b) Retrofilling:

Retrofilling is a separate procedure following apicoectomy by which a surgical cavity is prepared in the root end or lateral aspect of the root and a biologically acceptable filling material is placed into that prepared cavity.

Indications: Retrofilling is indicated for correction of resorptive defects of the root or when the clinician is unable to negotiate a canal in a routine manner because of iatrogenic problems or anatomic complications of the canal system. This technique may be utilized when a root is perforated in previously treated teeth or where an inadequate apical seal is present as evidenced by a persistent periradicular lesion after completion of conventional root canal filling. It also is indicated for a tooth restored with a root canal post structure that cannot be removed and that exhibits periradicular symptoms or signs of pathology, for treatment of root perforations, or when there are persistent or recurrent signs and/or symptoms of lateral or periapical pathology that cannot be sealed by a non-surgical approach.

Objectives: Absence of post-treatment adverse clinical signs or symptoms such as sensitivity, pain, or swelling. Alveolar bone repair at the site of the treated root(s) should exhibit a normal appearance with reestablishment of the periodontal ligament space. Retrofilling material should be within the confines of the root and should seal the root canal. There should be no damage to the adjacent teeth or anatomical structures.

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5. Pediatric Dental Surgery Services

Children often require surgical procedures to:

- Alleviate pain,
- Alleviate infection,
- Remove developmental abnormalities within the bone surrounding teeth such as periapical cysts and granulomas,
- Extract non-restorable carious teeth,
- Extract teeth damaged by trauma,
- Extract teeth as a result of unsuccessful endodontic procedures,
- Extract mobile teeth secondary to periodontal disease,
- Extract over-retained deciduous (primary) teeth,
- Extract teeth due to systemic disease (e.g., immune system abnormalities),
- Extract supernumerary (extra) teeth,
- Biopsy abnormal tissue,
- Extract teeth to prevent or correct a malocclusion (problems of tooth alignment),
- Excise hyperplastic frenum attachments (attachments between lips or soft tissues jaws),
- Replace fixed gingival tissue to prevent or correct gingival recession (loss of gum tissue),
- Suture lacerations (cuts, tears or wounds),
- Remove foreign bodies from oral and perioral tissues secondary to trauma.

In addition to consideration of the child's stage of physical development, pediatric surgical procedures also must incorporate effective techniques for managing anxiety and achieving cooperation during the required procedures and dealing with post-treatment discomfort. Additional discussion of commonly used forms of behavior management including sedation and general anesthesia is presented below.

6. Periodontal Diseases and Gingival/Mucosal Lesions

Etiology: Periodontal diseases affect the oral structures that support the teeth in the lower and upper jaws (mandible and maxilla). The periodontium consists of gingiva (gums), the periodontal ligaments (PDL) and the surfaces of the tooth and surrounding bone. Periodontal diseases generally are bacterial in nature, but can be accentuated by several systemic diseases. Damage occurs when the PDL detaches from the tooth and bone or there is loss of bone support for the tooth. Different periodontal disease entities are caused by increased levels of *Actinomyces sp.*, *P. Gingivitis* and other strains of bacteria.

Singularly or in combination, systemic diseases, medications, acute illnesses, lack of professional care, altered immunity to infections, tobacco use and inadequate oral hygiene procedures can exacerbate the periodontal disease process. Periodontal disease in children can be acute or chronic and affect the soft tissue, supporting structures, hard tissue or a combination of these three.

Various gingival and intra-oral mucosal (soft tissue) lesions frequently occur in children. Many are expressions of systemic diseases with oral manifestations.

Prevalence and Severity: Epidemiological surveys document that gingivitis (inflammation of the gums) of varying severity is a nearly universal condition in children and teenagers. Results of studies in children concerning disease patterns of more severe forms of periodontal diseases indicate a wide variation in the disease. Depending upon the study cited, loss of periodontal attachment ranges from 1% to 46% of children between the ages of 5 and 15 years. This wide variation may be due to different study populations or measurement methods. With appropriate and timely treatment, gingivitis and more severe forms of periodontal disease generally can be managed so as to prevent more severe consequences for the adult dentition and supporting tissues.

Many children and adolescents with chronic diseases or disabilities have an increased need for periodontal therapy. As noted above, use of tobacco products can affect periodontal health. Individuals with a variety of systemic conditions such as Downs syndrome, mental retardation, seizures disorders, cerebral palsy, diabetes and children and teenagers who are institutionalized exhibit an increased susceptibility to periodontal disease.

- In the next section, periodontal and oral soft tissue conditions that affect children and adolescents are discussed. These conditions include: Chronic gingivitis,
- Early-onset periodontitis,
- Necrotizing ulcerative gingivitis,
- Periodontitis associated with systemic or chronic diseases,
- Localized ulcerations of the mouth caused by trauma, tobacco, systemic diseases, viral or bacteria infections or medication,
- Drug-induced gingival hyperplasia, and
- Localized problems caused by tooth position, frenums (muscle attachments) and eruption of teeth.

In advanced stages, most periodontal conditions can lead to bone destruction and loss of teeth and supporting structures. This destruction can drastically increase future dental needs and downstream treatment costs. Early diagnosis and treatment is critical to reducing the severity of the disease. Diagnosis is also important to distinguish self-limiting oral lesions from those caused by systemic illness that needs intervention by health professionals. The effects of periodontal disease can be largely reduced or eliminated with proper oral hygiene and adequate preventive measures.

Disease Classification and Treatment

a) Chronic Gingivitis:

Chronic gingivitis is a common, reversible affliction of childhood and is clinically evidenced by inflammation, bleeding and swelling of the gums. This disease can be found in very young children through adolescence. There is little evidence of bone loss or damage to the gingival attachments.

Treatment: Chronic gingivitis usually responds to removal of bacteria and plaque. Treatment consists of instruction in proper tooth brushing and other home care techniques and provision of dental prophylaxis. More frequent prophylaxis and oral hygiene instruction may be necessary to resolve the condition.

b) Early-Onset Periodontitis

Early onset periodontitis is either localized or generalized. The local type, often referred to as localized juvenile periodontitis (LJP) is found in teenagers and young adults. It is asymptomatic and occurs without evidence of any systemic disease. Clinically, there may be mild swelling and bleeding from the gums and pocket formation due to inflammation and bone loss. Radiographically, it is characterized by

severe loss of the alveolar bone primarily around the permanent first molars and incisors. This disease can also affect the primary teeth. Most studies report a low incidence of LJP in the range of 0.2%. The African-American population shows a disease rate as high as 2.5%. The exact cause is unknown, but abnormal bacterial interaction with tissue is suspected. If treated early with antibiotics, the disease may respond well. The generalized type (GJP) is more common in teenagers and young adult, and can begin around puberty. This type often affects the entire dentition. It is characterized by marked periodontal inflammation and heavy deposits of plaque and calculus. The reported prevalence of GJP in adolescents (14-17 years old) in the United States is 0.13%. This form of the disease is caused by Gram-negative bacteria.

Treatment: Successful treatment of early onset periodontitis depends upon early diagnosis combined with antibiotic therapy and/or periodontal debridement (cleaning of affected tissues) to remove plaque and calculus. Repeated mechanical therapy may be needed to arrest the disease. Oral hygiene instruction may also be necessary.

c) Necrotizing Ulcerative Gingivitis and Acute Necrotizing Ulcerative Gingivitis

Necrotizing ulcerative gingivitis is not common in the U.S., but is seen more frequently in immigrant populations from Africa, Asia and South America. Viral infections, malnutrition, emotional stress, lack of rest and systemic diseases can predispose a child to the illness. The clinical findings include but are not limited to rapid onset of interproximal gingival necrosis and ulceration, accompanied by fever. It is usually accompanied by pain and discomfort on eating or drinking. Dehydration is one of the more severe side effects that can require hospitalization. *Acute necrotizing ulcerative gingivitis* is a common childhood viral disease. Clinically, it appears as multiple ulcerative lesions of the lips, tongue and gingiva. There is often concomitant fever, mouth pain, malaise, mouth odor and irritability. The disease generally runs its course in ten to fourteen days.

Treatment: Treatment involves topical therapy, palliative medications, adequate fluid intake and careful follow up. The child may also require debridement of the mouth to remove post-infection necrotic tissue and reduce subsequent gingivitis. Oral hygiene instruction and additional dental prophylaxis may be necessary.

d) Periodontitis Associated with Systemic or Chronic Diseases

Chronic systemic childhood diseases can contribute to periodontitis. The main disease entities include, but are not limited to, Papillon-Lefevre syndrome, seizure disorders treated with Dilantin, cyclic neutropenia, agranulocytosis, Down syndrome, diabetes mellitus, leukocyte adherence deficiency, sickle cell anemia, neuromuscular disabilities, leukemia, nutritional problems and certain cancer therapies.

Treatment: Treatment depends on the severity of the condition and can range from careful observation, oral hygiene instruction and more frequent removal of plaque to advanced periodontal treatment.

e) Drug-Induced Gingival Hyperplasia:

Several drugs used to control seizures or to prevent organ transplant rejection in patients with reduced ability to practice adequate oral hygiene procedures can result in enlarged gingiva. This condition creates deep periodontal pockets or pseudo-pockets that trap bacteria and further accentuate the periodontal disease process.

Treatment: The enlarged gingival tissue may need to be surgically removed if it cannot be controlled by more strenuous oral hygiene procedures. This often requires hospitalization, sedation, or general anesthesia. Oral hygiene instruction with the patient or primary care taker is often necessary, along with increased frequency of dental prophylaxis visits to control or prevent recurrence of the condition.

f) Localized Ulcerations of the Mouth:

Children and adolescents frequently experience small-localized oral ulcerations that must be addressed because of pain and interference with eating. These lesions can be traumatic, viral, bacterial, from a systemic disease or medication-induced.

Treatment: Treatment is usually palliative in nature. In most cases the child must be examined and a diagnosis obtained. The lesions are usually self-limiting and heal with little intervention. In certain cases it may be necessary to prescribe or apply palliative medications. Some of these lesions indicate an underlying systemic disease entity and must be referred for follow-up medical care.

g) Localized Problems of a Mechanical Nature:

Malposition of the teeth, abnormal frenum (intraoral muscle) attachments and ectopic eruption of teeth can induce or exacerbate a periodontal abnormality. Common findings can include but are not limited to loss of gingival attachment, abnormal gingival architecture, bone loss and tooth loss.

Treatment: Treatment commonly includes oral prophylaxis, steps to reduce plaque and improve oral hygiene and, if necessary, treatment to improve tooth alignment. Occasionally, surgical interventions (e.g., repositioning or removing abnormal frenum/muscle attachments) are necessary.

7. Malocclusions and Orthodontic Treatment

Malocclusions or misalignments of teeth frequently result in crowded, irregular or protruding teeth that interfere with dental-oral function, dental-facial esthetics or increase the likelihood of injury to the teeth. Malocclusions can be genetically induced or developmental processes, or result from local factors such as premature tooth loss and digit or pacifier habits. When severe, malocclusions may produce a functional disturbance that interferes with mastication, swallowing, speech and normal function of the jaws – e.g., they may complicate problems of the temporomandibular joint (TMJ). Less severe malocclusions often involve some physiologic compensation to allow for adequate function.

Impaired dental-facial esthetics can have a profound effect on a child's psychosocial development, and if extreme, may be considered as "handicapping." These consequences should not be ignored, especially when a child's self-image and social interactions are being affected by malposed teeth. Consultation with a child's physician or psychologist can help identify children in need of orthodontic care based upon psychosocial needs.

The reported incidence of dental-facial malocclusions varies with the defining criteria used by different investigators. Little is known of the national prevalence of malocclusion. The last national survey, conducted in 1967 by the US Public Health Service using Grainger's Treatment Priority Index, reported that approximately 25% of children age 6-11 years had near-ideal occlusion; but by age 12-17 years, only 12% have near-ideal occlusion. Crowding and malaligned teeth account for 40% of malocclusions in 6-11 year old children and 85% of malocclusions in children 12-17 years old. Anterior-posterior discrepancies account for 15-20% of malocclusions, with vertical and transverse disharmonies accounting for less than 10% of all malocclusions.

Preventing and Treating Malocclusions

A comprehensive evaluation of the child's developing malocclusion in the primary or early mixed dentition stage identifies abnormalities that if addressed early in a child's dental development often eliminate or reduce the need for major orthodontic treatment later. Orthodontic treatment may be preventive, interceptive or comprehensive. There is an almost endless list of therapeutic tools and appliances used to modify abnormal developing occlusions. Determining criteria for identifying children

in need of orthodontic services is a complex challenge. The Grainger Orthodontic Treatment Priority Index, HLD and South Carolina Orthodontic Screening Index are common approaches for assessing the severity of malocclusions in the transitional or adolescent dentition. These indices and others are often used by state Medicaid programs to "screen" for eligibility for orthodontic treatment. In spite of the general utility of these screening tools, Medicaid program directors are encouraged to utilize dentists trained and experienced in pediatric orthodontic and dental-facial orthopedic care to develop and implement orthodontic treatment criteria that can be applied reliably and consistently. Because of these complexities noted above, decisions to provide Medicaid orthodontic services should be made in conjunction with dental and other health professional consultants to the Medicaid program using the developed criteria. Orthodontic, facial orthopedic and surgical orthodontic services are generally considered to be medically necessary services for children with craniofacial anomalies as part of their comprehensive rehabilitation.

a) Prevention of Malocclusions

Space maintenance and elimination of oral habits (non-nutritive sucking) are the primary approaches used to prevent the oral neuromuscular complex from developing into an abnormal physical and functional relationship (malocclusion) or minimize the occurrence of traumatic injury to maxillary anterior teeth.

Space Maintenance: A space maintainer is required when primary or permanent teeth are lost prematurely or there is a need to preserve space for permanent teeth. When teeth are lost prematurely, the forces that hold the tooth in its proper position are no longer in equilibrium. It is not unusual for the adjacent teeth to tip into the newly opened space, blocking out an unerupted permanent tooth or permitting the opposing tooth to supra-erupt into the space. By placing a space maintainer, these forces are held in balance and allow for normal eruption of the permanent tooth while adjacent teeth are held in their normal position. Space maintainers can be fixed or removable, and unilateral or bilateral. When using fixed space maintainers, teeth used to attach the appliance are fitted with a stainless steel orthodontic band to which a heavy stainless steel orthodontic wire is soldered in the laboratory. The wire may have several different designs depending upon the age of the child and the number and position of missing teeth. Removable space maintainers are used bilaterally, made of acrylic with wire retention clasps, and generally replace multiple missing teeth.

Eliminating Oral Habits: Non-nutritive sucking (thumb/finger sucking or pacifier use) are common behaviors that should not be allowed to complicate or interfere with the normal growth and development of the oral facial structures. Non-nutritive sucking is a normal activity in most children under the age of two years. Attempts to change this habit before the age of 24-30 months usually proves difficult and unnecessary. However, if continued beyond this age (depending upon the frequency, duration and intensity of the habit), the position of the teeth can be altered. The most commonly observed changes from these habits are:

- Flaring of the maxillary incisors (bucked teeth),
- Development of an anterior open bite (large vertical gap between upper and lower front teeth), and
- Development of a posterior cross-bite with a functional shift of the mandible.

Flaring of the maxillary primary incisors and persistence of a small open bite generally will have no abnormal effect on the position of the permanent incisors if the habit is stopped before the appearance of the erupting permanent incisors. Severe flaring of the deciduous maxillary incisors or large anterior open bite, particularly when combined with a retrusive mandible (lower jaw), can interfere with speech development and mastication, and should receive attention. The presence of a posterior cross-bite (maxillary canines or molars inside the mandibular (lower jaw) teeth accompanied by a shift of the mandible laterally when the child bites the teeth together signals a potentially serious developmental disturbance. These functional shifts of the mandible should be treated as early as possible (between 3 and

4 years of age) to prevent asymmetric growth of the tempromandibular joint and/or mandible. For flared maxillary incisor teeth, preventive or corrective appliances for oral habits are indicated when the child reaches 4-5 years.

b) Interceptive Orthodontics

Interceptive orthodontic treatment (early treatment before the malocclusion has fully developed) is designed to enhance the child's occlusal function and appearance at an early age and minimize occlusal abnormalities that worsen with growth and eruption of permanent teeth. Typically, interceptive orthodontics involves correction of transverse (arch width) abnormalities, arch development to prevent dental crowding, anterior-posterior skeletal and dental relationships, and alignment of the upper and lower incisors. Appliances for interceptive orthodontic treatment may be either fixed or removable, with treatment rarely exceeding 12 to 14 months.

Treatment of Maxillary Dental Protrusion: Protruding incisor teeth are at increased risk of receiving some sort of trauma resulting in dental fractures or devitalization of the pulp. Thus, minimizing the risk of dental trauma to anterior teeth through interceptive or definitive orthodontic treatment should be considered a part of comprehensive preventive dental care. Interceptive (early) orthodontic treatment of the transitional dentition (mixed primary and permanent teeth) can eliminate severe dental protrusion and prevent the likelihood of traumatic injury or loss of the anterior teeth. It is indicated when there is severe maxillary protrusion or flaring of the maxillary (upper) incisor teeth – e.g., with an overjet (horizontal gap between the upper and lower teeth) of over 7-8mm. A variety of appliances, both fixed and removable, are used depending upon compliance and other craniofacial/dental growth factors.

c) Comprehensive Orthodontic Treatment

When comprehensive orthodontic treatment is determined by the state Medicaid program to be medically necessary, it provides for diagnosis and treatment of the patient's entire oral facial complex from early childhood through completion of dental-facial growth. It is designed to address the patient's orthodontic and facial orthopedic needs, either through a single course of treatment or through specifically planned stages of treatment. Comprehensive treatment is commonly completed with fixed orthodontic appliances during the adolescent years, occasionally combined with an orthognathic (jaw repositioning) surgical procedure in cases of severe maxillary/mandibular discrepancies or orofacial congenital anomalies.

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8. Treatment of Traumatic Injuries and Other Urgent Dental or Oral Conditions

a) Emergency Dental Services

Trauma to the teeth is common among children of all ages and frequently requires timely management. Children from populations having a high prevalence and severity of dental disease commonly have additional urgent dental needs as a result of pain and infection. Pulpal infection, periapical abscesses and facial cellulitis from untreated dental caries or traumatic injuries frequently are the initial motivating factors responsible for a first dental visit for these children. Alternatively, improved oral health outcomes and reduced health care expenses (e.g., from reductions in hospital-based care) could be realized by establishing “Dental Homes” with proactive preventive and early-treatment dental programs in familiar, lower-cost community-based treatment facilities. For those children who do experience emergent or urgent conditions, a range of clinical and radiographic services will be necessary to deal with the situation, independent of other program benefits (e.g., additional radiographs beyond those normally scheduled may be needed).

b) Oral/Facial Trauma

Etiology and Incidence: Facial trauma that results in fractured, displaced or lost teeth can have significant negative functional, esthetic and psychological effects on children. Falls account for the majority of dental trauma in children 1 to 5 years old. In 6-12 year-old children, bicycle accidents, sports and being struck by an object account for most injuries. Bicycle accidents and sports are the most common causes of dental trauma in 13-17 year old adolescents, with fights, sports and vehicle accidents accounting for most dental injuries in young adults. At least 50% of children experience one injury involving their teeth by 14 years of age; and children with protruding front teeth have twice the risk for anterior dental trauma.

Preventing Oral Facial Trauma: High school and college football, lacrosse, and ice hockey have demonstrated that introducing mandatory protective equipment can significantly reduce dental and facial injuries. Popular sports such as baseball, basketball, soccer, field hockey, softball, wrestling, volleyball and gymnastics lag far behind in injury protection for girls as well as boys. Although few state Medicaid programs currently include coverage for services for the construction of protective equipment to prevent sports-related dental and oral-facial injuries, inclusion of such coverage by dental benefits programs for children (e.g., Medicaid, SCHIP, and commercial dental plans), as well as by other public agencies and sporting programs, would help prevent such injuries. Youths participating in leisure activities such as skateboarding, roller-blading and bicycling would also benefit from use of appropriate protective equipment.

Injury Assessment and Diagnosis: Assessment of children who have sustained traumatic injuries to the head, face or oral/dental tissues should include a review of the patient’s medical/dental history, a thorough assessment of the etiology of the trauma, and a comprehensive examination. Examining the child with an oral/dental injury can be a challenge if the child is crying, agitated or resistive, and may require sedation or additional forms of behavior management. Nevertheless, the examination must be thorough and complete to identify injuries that require immediate treatment and reduce the likelihood of consequences that can lead to tooth loss, future pain or infection, or additional dental treatment. Medical radiographs may be necessary if a missing tooth or tooth fragment cannot be located. Lateral soft tissue neck and chest and abdominal radiographs for foreign bodies (teeth or tooth fragments) are often ordered to ensure tooth fragments are not lodged in the airway.

Management and Treatment: Dental/oral injuries may require immediate dental intervention or treatment within 24-48 hours following the traumatic injury. Providers participating in public-funded dental programs should be available to their patients and provide emergency care when called upon. Following an assessment of the injury or immediate situation, a variety of treatments may be required. Stabilization of teeth and bone, endodontic procedures, restorative procedures, suturing and extractions are among the more common emergency care needs. Periodic follow-up appointments for all types of

dental trauma are necessary to monitor and, if necessary, treat any detrimental effects of pulp necrosis, subsequent infection or peripheral root resorption resulting from the injury. These appointments typically consist of a limited oral evaluation, pulp vitality test and/or selected dental radiographs, as necessary.

Oral Aspects of Child Abuse: Contusions, lacerations, punctures, fractured teeth, or displaced or avulsed teeth are common physical injuries of the oral cavity in cases of child abuse. The physical findings of child abuse should be photographed for later documentation. Bite marks can often be recorded with either photography or dental impressions of the bite marks. The oral cavity also is a frequent site of sexual abuse; and oral signs of gonorrhea or syphilis may need to be confirmed through bacterial cultures.

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B. Dental Care for Children with Special Healthcare Needs

Eighteen percent of U.S. children and adolescents ages 18 and under (or 12.6 million children and adolescents) have a chronic illness or disability, with a high percentage being covered by Medicaid. Although study findings regarding prevalence and severity vary, there is general agreement that most Children with Special Healthcare Needs (CSHN) are associated with higher risk for acquiring dental-facial malformations, dental disease or dental infection. CSHN have medical disorders that:

- place the child at risk to develop dental disease;
- place the child at risk for dental infection that can complicate the course of their systemic disease;
- compromise, complicate or increase the likelihood of needing dental care; or
- become the primary focus for their parents and non-dental health providers, thereby often delaying the start of a preventive dental program until the child experiences significant dental pain or infection.

Special emphasis should be placed in establishing a “Dental Home’ for these children as early as possible (between 6 and 12 months of age) to:

- implement an individualized preventive dental program and
- give parents or caregivers specific instruction in oral hygiene procedures and a clear understanding of the relationships between the child’s dental health and systemic disorder.

Children with craniofacial or orofacial anomalies such as cleft lip and/or palate need expanded services usually coordinated by a team of physicians and dentists. In addition, many developmental or genetic abnormalities, such as ectodermal dysplasia, are accompanied by malformed or missing teeth that can have significant negative functional, esthetic and psychological effects on the children and their families. Young children benefit from esthetic and functional restorative techniques and readily adapt to appliances that replace missing teeth and improve function, appearance and self-image. During the period of facial and oral growth, appliances require frequent adjustment and have to be remade as the child grows.

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2. Newacheck PW et al 1998. An epidemiologic profile of children with special health care needs. *Pediatrics* 102 (1):117-121.

C. Behavior Management

It has been estimated that 85 percent of children can cooperate for dental treatment, while the remaining 15 percent will require behavior management of some type in order to effect dental treatment. While definitions may vary, behavior management can be defined as purposeful application of accepted techniques, both pharmacologic and non-pharmacologic, to reduce fear and anxiety, enhance cooperation and effect treatment. Behavior management is a skill acquired by a provider through training and enhanced with experience. Behavioral management of anxious and children who are unable to cooperate easily in the traditional dental office may require additional time on the part of the provider for a dental procedure that would otherwise be provided in less time.

Techniques

Communicative (non-aversive) techniques are considered inherent in care of children. These include tell-show-do, voice control, positive reinforcement and distraction. These techniques are used routinely to effect treatment in the pediatric population and are indicated when a child shows mild anxiety, failure to attend, or mild disruptive behavior. It is assumed that a general consent for dental care encompasses the dentist's use of these techniques. The cost of these services is usually assumed within the fee for the service. On occasion, a clearly necessary dental service may be made substantially more difficult because of inability of the patient to easily cooperate in receiving the service as a result of anxiety, inappropriate behaviors, or mental or other disability. Such situations may require the dentist to devote substantially more time than normal to communicative behavioral techniques in an effort to provide the service while avoiding the need for additional, more invasive behavioral management techniques. Since the additional time spent when such situations arise substantially increases the cost of providing the service, state Medicaid programs may wish to consider separate reimbursement for extensive use of communicative behavior management techniques. A separate procedure code ("behavioral management, by report") is available for such use in the American Dental Association's code of dental procedures and nomenclature, Current Dental Terminology (CDT-3)

Non-communicative techniques include immobilization, analgesia (nitrous oxide), sedation and general anesthesia. These techniques are considered supplemental to routine care and as such require additional consent. These techniques are covered and reported using separate procedure codes in the American Dental Association's code of dental procedures and nomenclature, Current Dental Terminology (CDT-3). These procedures also are detailed in the Guidelines for Behavior Management of the American Academy of Pediatric Dentistry in the AAPD Reference Manual.

Immobilization is used to prevent injury to patient and providers. Immobilization can require additional staff, caretakers and/or devices to safely constrain movement that might be dangerous to patient or staff or affect quality of care.

Indications: Patient is unwilling or unable to control movements and presents a danger to staff or self during treatment procedures deemed necessary.

Contraindications: Immobilization cannot be used as punishment or when it presents risk of injury to the patient.

Analgesia (Nitrous Oxide-Oxygen Analgesia) is an inhalation technique using a combination of nitrous oxide and oxygen in concentrations that relax, but do not render a patient unconscious.

Indications: Analgesia can be used for the anxious or obstreperous child, certain CSHN, patients with hyperreflexia of the gag reflex, and for those with inadequate response to local anesthetic.

Contraindications: Certain pulmonary conditions, emotional illnesses, drug dependencies, pregnancy may be contraindications to analgesia.

Sedation is administration of a centrally acting pharmacologic agent orally, intravenously, rectally, intranasally, or submucosally to induce a level of consciousness that will permit safe and effective dental care. A complete perspective of the use of sedation in children can be found in guidelines for use of conscious sedation from the American Academy of Pediatric Dentistry.

Indications: Children who are anxious or uncooperative for dental care, whose health status permits use of sedative agents, and who, in the judgment of the dentist or from previous ineffective care under other behavioral techniques, are best treated with this technique.

Contraindications: Children whose health status precludes use of sedative agents or whose dental disease status requires or permits utilization of alternative methods.

General Anesthesia is a technique in which a child is rendered unconscious with a single or combination of pharmacologic agents. General anesthesia is most appropriately administered in an approved facility by a trained provider. A complete description of general anesthesia and indications for its use can be found in the *Guidelines for Behavioral Management* of the American Academy of Pediatric Dentistry.

Indications: Children whose physical, mental, or medical condition precludes other behavior management choices, who are preoperative, and whose dental needs merit treatment best performed under general anesthesia.

Contraindications: Children whose dental needs are minor and those children whose medical status precludes use of general anesthesia.

References:

1. American Academy of Pediatric Dentistry Reference Manual, Chicago, IL: American Academy of Pediatric Dentistry. 2000.
2. U.S. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville, MD: U. S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health, 2000.

D. American Academy of Pediatric Dentistry Periodicity Schedule

Periodicity of Examination, Preventive Dental Services, Anticipatory Guidance and Oral Treatment for Children.

Birth-12 Months (for Children with Special Health Care Needs or at High Risk for Caries)

1. Complete the clinical oral assessment and appropriate diagnostic tests to assess oral growth and development and/or pathology.
2. Provide oral hygiene counseling for parents, guardians, and caregivers, including the implications of the oral health of the caregiver.
3. Remove supra- and subgingival stains or deposits as indicated.
4. Assess the child's systemic and topical fluoride status (including type of infant formula used, if any, and exposure to fluoridated toothpaste), and provide counseling regarding fluoride. Prescribe systemic fluoride supplements if indicated, following assessment of total fluoride intake from drinking water, diet, and oral hygiene products.
5. Assess appropriateness of feeding practices, including bottle and breast-feeding, and provide counseling as indicated.
6. Provide dietary counseling related to oral health.
7. Provide age-appropriate injury prevention counseling for orofacial trauma.
8. Provide counseling for non-nutritive oral habits (digit, pacifiers, etc.).
9. Provide diagnosis and required treatment and/or appropriate referral for any oral diseases or injuries.
10. Provide anticipatory guidance for parent/guardian.
11. Consult with the child's physician as needed.
12. Based on evaluation and history, assess the patient's risk for oral disease.
13. Determine the interval for periodic reevaluation.

12-24 Months²

1. Repeat Birth-12 month procedures every six months or as indicated by individual patient's needs/susceptibility to disease.
2. Review patient's fluoride status, including any childcare arrangements, which may impact on systemic fluoride intake and provide parental counseling.
3. Provide topical fluoride treatments every six months or as indicated by the individual patient's needs.

2-6 Years

1. Repeat 12-24 month procedures every six months or as indicated by individual patient's needs/susceptibility to disease. Provide age-appropriate oral hygiene instructions.

² All children should have established a dental home during this period.

2. Complete a radiographic assessment of pathology and/or abnormal growth and development, as indicated by individual patient's needs.
3. Scale and clean the teeth every six months or as indicated by the individual patient's needs.
4. Provide topical fluoride treatments every six months or as indicated by the individual patient's needs.
5. Provide pit and fissure sealants for primary and permanent teeth as indicated by individual patient's needs.
6. Provide counseling and services (athletic mouth guards) as needed for orofacial trauma prevention.
7. Provide assessment/treatment or referral of developing malocclusion as indicated by individual patient's needs.
8. Provide diagnosis and required treatment and/or appropriate referral for any oral diseases, habits, or injuries as indicated.
9. Assess speech and language development, and provide appropriate referral as indicated.

6-12 Years

1. Repeat 2-6 year procedures every six months or as indicated by individual patient's needs/susceptibility to disease.
2. Provide substance abuse counseling (smoking, smokeless tobacco, etc.).

12-18 Years

1. Repeat 6-12 year procedures every six months or as indicated by individual patient's needs/susceptibility to disease.
2. At an age determined by patient, parent, and dentist, refer the patient to a general dentist for continuing oral care. Infant Oral Health Care

References:

1. American Academy of Pediatric Dentistry, Reference Manual 2000-01 *Pediatr Dent* 2000;22.

Recommendations for Preventive Pediatric Dental Care*

Because each child is unique these **Recommendations** are designed for the care of children who have no contributing medical conditions and are developing normally. These **Recommendations** will need to be modified for children with special

health care needs or if disease or trauma manifests variations from normal. The **Academy** emphasizes the importance of **very** early¹ professional intervention and the continuity of care based on the individualized needs of the child.

Age	Infancy 6–12 Months	Late Infancy 12–24 Month	Preschool 2–6 Years	School-Age 6–12 Years	Adolescence 12–18 Years
Oral Hygiene ² Counseling	Parents/Guardians/ Caregivers	Parents/Guardians/ Caregivers	Patient/Parent/ Guardian/Caregivers	Patient/Parent/ Guardian/Caregivers	Patient
Injury Prevention Counseling ³	•	•	•	•	•
Dietary Counseling ⁴	•	•	•	•	•
Counseling for Non-nutritive Habits ⁵	•	•	•	•	•
Fluoride Supplementation ^{6,7}	•	•	•	•	•
Assess Oral Growth ⁸ and Development	•	•	•	•	•
Clinical Oral Exam	•	•	•	•	•
Prophylaxis and Topical Fluoride Treatment ⁹		•	•	•	•
Radiographic Assessment ¹⁰			•	•	•
Pit and Fissure Sealants			If indicate on primary molars	1st permanent molars as soon as possible after eruption	2nd permanent molars and appropriate premolars as soon as possible after eruption
Treatment of Dental Disease/Injury	•	•	•	•	•
Assessment and Treatment of Developing Malocclusion			•	•	•
Substance Abuse Counseling				•	•
Assessment and/or Removal of 3rd Molars					•
Referral for Regular and Periodic Dental Care					•
Anticipatory Guidance ¹¹	•	•	•	•	•

1. First exam at the eruption of the 1st tooth and no later than 12 months.
2. Initially, responsibility of the parent; as child develops jointly with parents; then when indicated only child.
3. Initially play objects, pacifiers, care seats; then when learning to walk sports, routine playing, and intraoral/perioral piercing.
5. At every appointment discussion the role of refined carbohydrates; frequency of snacking.
5. At first discuss the need for additional sucking; digits vs. pacifiers; then the need to wean from the habit before the eruption of a permanent incisor. For

- school-aged children and adolescent patients, counsel regarding any existing habits such as fingernail biting, clenching, or bruxism.
6. As per AAP/ADA Guidelines and the water source.
7. Up to at least 16 years.
8. By clinical examination.
9. Especially for children at high risk for caries and periodontal disease.
10. As per AAPD Radiographic Guidelines.
11. Appropriate discussion and counseling should be an integral part of each visit for care.

* American Academy of Pediatric Dentistry, May, 1992

E. Guidelines for Prescribing Dental Radiographs

Guidelines for prescribing dental radiographs (x-rays) have been developed by an expert panel from the dental profession under the auspices of the Food and Drug Administration (FDA). The panel was convened by the FDA to reach a consensus on standardizing dental radiographic procedures because dental radiographs rank second in frequency of use and in total cost to the public. The panel was also concerned about saving the patient from unwarranted exposure to radiation. The guidelines serve as recommendations that dentists can use to determine when they should take a radiograph. They help determine the type of radiograph needed, how frequently and under what conditions radiographs should be taken. Under these guidelines, a dentist will take an X-ray based on clinical observation and the patient's health history. Dental radiographs serve only as adjuncts to a comprehensive oral examination and evaluation and by themselves or in conjunction with photographs do not provide adequate information to determine a properly developed treatment plan. Radiographs taken only for administrative purposes expose the child to unnecessary radiation, and therefore are inappropriate, unethical, and violate ADA and FDA policies.

The guidelines are based on patient selection criteria, which are descriptions of clinical conditions derived from patient signs, symptoms and history that identify patients who are likely to benefit from a particular radiographic examination. The guidelines are illustrated in a chart designed to serve as a convenient reference and are offered as a supplement to professional expertise (see Table below). The recommendations in this chart are subject to clinical judgment and may not apply to every patient. They are to be used by dentists only after reviewing the patient's health history and completing a clinical examination. The recommendations do not need to be altered because of pregnancy.

Guidelines for Prescribing Dental Radiographs

Patient Category	Child		Adolescent	Adult		*Clinical situations for which radiographs may be indicated include:
	Primary Dentition (prior to eruption of first permanent tooth)	Transitional Dentition (following eruption of first permanent tooth)	Permanent Dentition (prior to eruption of third molars)	Dentulous	Edentulous	
New patient* All new patients to assess dental diseases and growth and development	Posterior bite-wing examination if proximal surfaces of primary teeth cannot be visualized or probed	Individualized radiographic examination consisting of periapical/ occlusal views and posterior bite-wings or panoramic examination and posterior bite-wings	Individualized radiographic examination consisting of posterior bite-wings and selected periapicals. A full mouth intraoral radiographic examination is appropriate when the patient presents with clinical evidence of generalized dental disease or a history of extensive dental treatment		Full mouth intraoral radiographic examination or panoramic examination	A. Positive Historical Findings <ol style="list-style-type: none"> 1. Previous periodontal or endodontic therapy 2. History of pain or trauma 3. Familial history of dental anomalies 4. Postoperative evaluation of healing 5. Presence of implants B.. Positive Clinical Signs/Symptoms <ol style="list-style-type: none"> 1. Clinical evidence of periodontal disease 2. Large or deep restorations 3. Deep carious lesions 4. Malposed or clinically impacted teeth 5. Swelling 6. Evidence of facial trauma 7. Mobility of teeth 8. Fistula or sinus tract infection 9. Clinically suspected sinus pathology 10. Growth abnormalities. 11. Oral involvement in known or suspected systemic disease 12. Positive neurologic findings in the head and neck 13. Evidence of foreign objects 14. Pain and/or dysfunction of the temporomandibular joint 15. Facial asymmetry 16. Abutment teeth for fixed or removable partial prosthesis 17. Unexplained bleeding 18. Unexplained sensitivity of teeth 19. Unusual eruption, spacing or migration of teeth 20. Unusual tooth morphology, calcification or color 21. Missing teeth with unknown reason
Recall patient* Clinical caries or high-risk factors for caries [†]	Posterior bite-wing examination at 6-month intervals or until no carious lesions are evident.		Posterior bite-wing examination at 6- to 12-month intervals or until no carious lesions are evident	Posterior bite-wing examination at 12- to 18-month intervals	Not applicable	
No clinical caries and no high-risk factors for caries [†]	Posterior bite-wing examination at 12- to 24- month intervals if proximal surfaces of primary teeth cannot be visualized or probed.	Posterior bite-wing examination at 12- to 24-month intervals	Posterior bite-wing examination at 18- to 36-month intervals	Posterior bite-wing examination at 24- to 36-month intervals	Not applicable	
Periodontal disease or a history of periodontal treatment	Individualized radiographic examination consisting of selected periapical and/or bite-wing radiographs for areas where periodontal disease (other than nonspecific gingivitis) can be demonstrated clinically		Individualized radiographic examination consisting of selected periapical and/or bite-wing radiographs for areas where periodontal disease (other than nonspecific gingivitis) can be demonstrated clinically		Not applicable	
Growth and development assessment	Usually not indicated	Individualized radiographic examination consisting of a periapical/occlusal or panoramic examination	Periapical or panoramic examination to assess developing third molars	Usually not indicated	Usually not indicated	

The recommendations contained in this table were developed by an expert dental panel comprised of representatives from the Academy of General Dentistry, American Academy of Dental Radiology, American Academy of Oral Medicine, American Academy of Pediatric Dentistry, American Academy of Periodontology, and the American Dental Association under the sponsorship of the Food and Drug Administration (FDA). The chart is being reproduced and distributed to the dental community by Eastman Kodak Company in cooperation with the FDA.

† Patients at high risk for caries may demonstrate any of the following:

1. High level of caries experience
2. History of recurrent caries
3. Existing restoration of poor quality
4. Poor oral hygiene
5. Inadequate fluoride exposure
6. Prolonged nursing (bottle or breast)
7. Diet with high sucrose frequency
8. Poor family dental health
9. Developmental enamel defects
10. Developmental disability
11. Xerostomia
12. Genetic abnormality of teeth
13. Many multisurface restorations
14. Chemo/radiation therapy

Appendix B: AAPD Model Dental Benefits Statement

American Academy of Pediatric Dentistry
Dental Care Committee

Scope of Dental and Oral Health Care Benefits for Infants, Children, Adolescents, and Young Adults Through Age 21 Years

ABSTRACT: The optimal oral health of children can best be achieved by providing access to comprehensive dental and oral health care benefits. These services should be delivered by appropriately trained pediatric care providers, including primary dental care providers and specialists. This policy statement by the American Academy of Pediatric Dentistry is intended to complement similar policy statements concerning general pediatric health which have been issued by the American Academy of Pediatrics and provide supplementary information for dental and oral health care.

All infants, children, adolescents, and young adult patients through age 21 must have access to comprehensive dental and oral health care benefits that will contribute to their optimal health and well-being. The following services should be included in the health benefit plans offered by all private and public insurers. These services should be delivered by appropriately trained pediatric care providers, including primary dental care providers and specialists. These services should be delivered in a variety of appropriate settings, and coordinated through the child's primary dental care provider. The care also should be delivered and the benefits administered in an efficient manner that does not compromise the quality of care. **Services and benefits should include but are not limited to all of the following:**

Benefits and Coverage

a. Basic obligation – For enrollees under age 21, the dental and oral health services described in this section in accordance with professionally accepted standards of dental and oral health practice and applicable standards set forth in the *American Academy of Pediatric Dentistry Reference Manual*¹; *Guide to Clinical Preventive Services*²; *Workshop on Guidelines for Sealant Use: Recommendations*³; and *Bright Futures in Practice: Oral Health*.⁴

b. Preventive services:

(1) Education for the enrollee and, for younger children, the enrollee's family or caregiver on measures to promote the enrollee's dental and oral health and prevent dental and oral disease which shall be furnished by primary care practitioners as

¹ American Academy of Pediatric Dentistry Reference Manual, Chicago, IL: American Academy of Pediatric Dentistry.

part of initial and periodic well-child assessments and by dentists and other dental professionals as part of dental and oral health examinations;

(2) In the case of enrollees from birth until age three, oral screening by primary care practitioners which shall be furnished as part of initial and periodic well-child assessments, and dentists as part of initial and periodic examinations of the teeth and oral cavity and other dental and oral health services;

(3) Initial and periodic examinations of the teeth and oral cavity by dentists which shall include a medical and dental history to determine the presence of oral and dental health risk factors; and which shall be furnished in accordance with the dental periodicity schedule in the *American Academy of Pediatric Dentistry Reference Manual*¹ or when an oral screening indicates a risk of caries or other dental or oral disease;

(4) Fluoride therapies which shall include the following:

(A) Application of topical fluoride which shall be furnished at least annually and more frequently when medically indicated in the opinion of the enrollee's treating dental professional; and

(B) In the case of enrollees ages six months to sixteen years residing in an area with an inadequately fluoridated water supply, dietary fluoride supplements prescribed by a primary care practitioner or dentist in accordance with current policy recommendations of the American Dental Association,² and the American Academy of Pediatrics (AAP).³

(5) In the case of children at risk for caries in pits and fissures of the teeth because of tooth morphology or other risk factors identified by an assessment, application of dental sealants;

(6) Dental prophylactic services which shall be furnished at least annually and more frequently when medically indicated in the opinion of the enrollee's treating dental professional;

(7) Space maintainers.

c. Diagnostic, treatment and restorative services to relieve pain, resolve infection, restore teeth and maintain dental function and oral health, which shall be furnished in accordance with accepted standards of practice by dentists and other dental professionals acting within the scope of state law:

² U.S. Preventive Services Task Force Guide to Clinical Preventive Services, 2nd ed., International Medical Publishing, 1996. New Fluoride Guidelines Proposed. J Am Dent Assoc 1994; 125:366.

³ Workshop on Guidelines for Sealant Use: Recommendations. J Pub Health Dent 1995; 55:263-273..

- (1) Radiographs in accordance with recommendations of the U.S. Food and Drug Administration⁴ and the American Dental Association;⁵
- (2) Other diagnostic procedures as are medically indicated in the opinion of the treating dental professional;
- (3) Restorative services (fillings and pre-formed crowns) including restoration for permanent teeth and for primary teeth not nearing exfoliation;
- (4) Orthodontic services which shall include services for enrollees diagnosed with severe malocclusion, and for enrollees following repair of cleft palate; and for enrollees with other congenital or developmental defects or injury resulting in mal-alignment or severe malocclusion of teeth;
- (5) Endodontic services including root canal therapy and/or apicoectomy and apexification;
- (6) Dental and oral surgery which shall include anesthesia and adjunctive services and which shall be furnished on an inpatient basis when medically necessary;
- (7) Periodontic services;
- (8) Prosthodontic services;
- (9) Drugs prescribed (A) for relief of pain associated with dental or oral disease, condition or injury and (B) in conjunction with services described in this subsection;
- (10) Medically necessary adjunctive services that directly support the delivery of dental procedures which, in the judgment of the dentist, are necessary for the provision of optimal quality therapeutic and preventive oral care to patients with medical, physical or behavioral conditions. These services include but are not limited to sedation, general anesthesia, and utilization of outpatient or inpatient surgical facilities.

⁴ Casamassimo P. 1996. Bright Futures in Practice: Oral Health. Arlington, VA: National Center for Education in Maternal and Child Health.
The Selection of Patients for X-Ray Examination: Dental Radiographic Examinations. Rockville, Md.: Food and Drug Administration, 1998; HHS Publication Number 88-8273.

⁵ Council on Dental Materials, Instruments and Equipment. Recommendations in Radiographic Practices: An Update, 1988. J Amer Dent Assoc 1989 118:115-117.